MacWEEK

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HP delivers solid printer for network needs.

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Affinity's macro upgrade branches out.

General MIDI sound module
A comparison of two Mac sound generators.

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HP, Apple putting little engine from Canon in low-end printers

'Smart' QuickDraw LaserWriter in works

By Matthew Rothenberg

Santa Clara, Calif. — A diminutive new Canon laser engine making its debut this week in a Hewlett-Packard Co. printer also looms large in Apple's low-end printer plans, sources said.

The HP LaserJet 4ML is slated to ship this summer at a suggested retail price of $1,279, including Adobe PostScript Level 2. The first Apple model with the new engine, the Personal LaserWriter 300, could be available as early as June; lacking a processor or page description language, it could sell for less than $900, sources said. And early next year, Apple is expected to deliver a higher-end version designed for high-speed output of QuickDraw GX files.

The new 4-page-per-minute engine, manufactured by Canon U.S.A. Inc. of Lake Success, N.Y., outputs 300 dpi to letter-, legal- or A4-size pages. The engine is significantly smaller than previous models; the LaserJet 4ML, for example, weighs in at only 15.5 pounds and measures just 14.5 by 14 by 6.5 inches without paper trays.

The engine includes a one-button control panel and an energy-saving feature that powers down the printer when it is idle and automatically reactivates it when a user transmits a print job.

▶ **The HP LaserJet 4ML** incorporates a 20-MHz Intel Corp.

See Printers, Page 135

Special Report

THE FUTURE OF COLOR

What's in store?

Industry-expert round table on color management

The brewing battle among ink-matching systems

48-bit-color proposal

See Page 42

Kaleida puts off release of ScriptX until next spring

By Lisa Picarille and Neil McManus

Mountain View, Calif. — Kaleida Labs Inc. has delayed release of the Mac version of ScriptX, its cross-platform, interactive, multimedia scripting language, by more than six months.

In a major change of strategy, the Apple-IBM Corp. joint venture is now expected to ship both Macintosh and Windows versions of the product simultaneously in the first quarter of 1994.

"There is a good reason for [the delay]," Kaleida CEO Nat Goldhaber said. "The right position for Kaleida is cross-platform. That is one of the most important aspects of the product. So now we plan to bring out the two products simultaneously."

In addition to the Mac and Windows, ScriptX will run on Apple's Sweet Pea consumer multimedia

See ScriptX, Page 136

Due for Duos: Color, '040, Ethernet dock

By Robert Hess

Cupertino, Calif. — Over the next year and a half Apple will release Duos with gray-scale and color screens and 68040 and PowerPC processors, as well as an improved Duo Dock, sources said.

▶ **Greater grays.** In October Apple will offer customers a Duo with the same clear, crisp active-matrix gray-scale screen as the PowerBook 180's.

Identical to the Duo 230 in all other respects, Apple's new four-bit gray-scale Duo will feature a 9-inch, active-matrix display with the same shadow mask technology that gives the 180 its high-contrast appeal. It will even keep battery life to within 15 percent of the Duo 230, sources said.

▶ **Sharper colors.** Apple will reportedly forgo passive matrix in bringing color to dockable PowerBooks. The first color Duo, also slated for release in October, will have an eight-bit, active-matrix color screen, sources said. The dis-

See Future Duos, Page 136

Low-cost PB set for June; 180c to follow

By Raines Cohen

Cupertino, Calif. — Apple will fill some gaps in the PowerBook line this summer with a lower-cost entry-level model and an active-matrix color notebook.

In addition, the company will begin bundling a client-only version of AppleTalk Remote Access (ARA), its dial-up networking software, with all PowerBook models.

▶ **The PowerBook 145B,** due next month, will list for less than $1,500 in a 4/40 configuration and

See Summer PBs, Page 135



NEVIN BERGER

Sales sluggish for passive-matrix PB 165c

Many users waiting for active color screens

By Kirsten L. Parkinson and Jon Swartz

San Francisco — Apple may view its first color portable with rose-tinted glasses, but most users remain colorblind concerning the PowerBook 165c.

A spot survey of corporate buyers and dealers revealed that demand for the PowerBook 165c has "dropped off dramatically" since it became widely available in March.

One major Mac distributor said dealer orders plummeted from 1,000 units in March to only 170 last month. "Users are telling dealers the 165c is too expensive and doesn't have an active-matrix screen," she said.

Many business users, who snatched up the PowerBook and made it one of Apple's most successful product lines, said they don't need color when they're on the road. "We only have 140s and 145s. We really don't do that much with color for people who travel," said Tom Jeanette, computer support manager at Federal Express Corp. of Memphis, Tenn. "The people that travel mainly do spreadsheets and word processing."

At the same time, those who are

See PowerBook 165c, Page 135

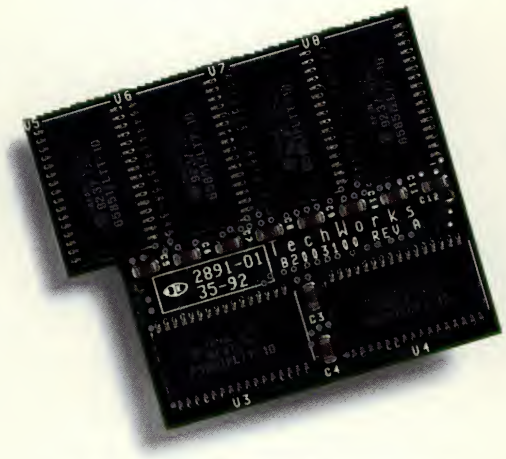


JAMES ARONOVSKY

Vernon Huang, a U.S. Navy flight surgeon based in Santa Ana, Calif., said the PowerBook 165c is "ideal" for displaying medical references.

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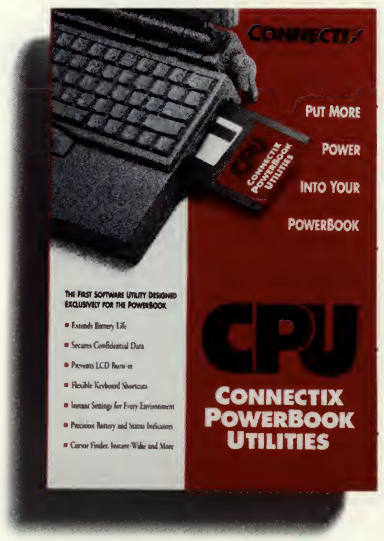
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TECHWORKS™



The HP 100LX, a new 11-ounce palmtop DOS device from Hewlett-Packard, offers communications capabilities that could appeal to some Mac users.

HP updates palmtop PC

100LX optimized for communications

By Henry Norr

Corvallis, Ore. — The HP 100LX, a new pocket-size IBM PC compatible from Hewlett-Packard Co., lacks the cutting-edge capabilities of Apple's upcoming Newton. But unlike the Newton, the $749 HP product should be available this week, is already supported by a vast library of applications and is optimized for communications, according to HP.

The 100LX, powered by an 80C186 CPU, is the same size and weight — 11 ounces — as its 2-year-old sibling, the HP 95LX. Both have 1 Mbyte of RAM and Lotus 1-2-3 in firmware, but the 100LX's 2-Mbyte ROM also includes cc:Mail Mobile, a special version of Lotus Development Corp.'s cross-platform electronic-mail software. With the addition of a third-party modem (in external or PCMCIA-card form), Mac users who have cc:Mail on their office networks will have full access to their messages.

While the 95LX required special versions of DOS software, the new model can run off-the-shelf DOS applications, HP said. Other enhancements include a new screen with higher contrast and resolution; a 50 percent increase in CPU performance; an improved suite of personal information management applications; and a nine-pin serial port that works with standard handshaking cables, unlike the 95LX's three-pin connector.

HP officials estimated that 20 percent of 95LX owners are Mac users. Two vendors that offer Mac-95LX connectivity products plan to update their packages to support the 100LX. DataViz Inc. of Trumbull, Conn., which currently offers a $129 package called MacLinkPlus/95LX, said it expects to release a new version called MacLinkPlus/HP Palmtop, with cables and format-translation software for both the 95LX and the 100LX. Sparcom Corp., based here, said it expects to release new versions of Mac DataExchange, its $89.95 cable-and-software kit, and of its SmartDock, a docking station bundled with Mac or IBM PC software, sometime this summer.

Also due later this year are updated wireless-communications add-ons from RAM Mobile Data Inc., Motorola Inc. and SkyTel Inc.

The 100LX will be sold through computer dealers and superstores. The 95LX will remain available through consumer-electronics channels.

In other personal digital assistant news, EO Inc. last month shipped its device (see story, Page 26).

Hewlett-Packard Co. is at N.E. Circle Blvd., Corvallis, Ore. 97330. Phone (800) 443-1254. □

Ingram to sell third-party software on CD

Santa Ana, Calif. — Ingram Micro Inc. last week announced the creation of a new division to sell third-party software on CD-ROMs and other media.

Ingram Micro Technology Services will launch its first program, CD-Access, in September. It will provide resellers with a CD containing both demo and full but encrypted versions, plus manuals of 100 to 200 programs, including business and education software, utilities, and games for the Mac, Windows and DOS.

The company plans to initiate the program with a pressing of 500,000 discs, which resellers will be able to distribute free to customers. Users will be able to get decryption codes providing access to the full versions of the software by calling a toll-free number and providing a credit card number. Resellers will earn a commission for each product unlocked from discs they distributed.

Two competing distributors, Merisel Inc. and Tech Data Corp., said they will offer similar services this year. Apple reportedly is planning its own CD-ROM-based software sales program. □

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SyQuest confronts clone disks

Iomega to market French cartridges

By Henry Norr

Santa Clara, Calif. — Users of SyQuest drives may soon be able to get additional cartridges from a surprising second source, but SyQuest Technology Inc. is warning customers — and arguing in U.S. and foreign courts — that the third-party media could damage its drives and put existing data in jeopardy.

Iomega Corp., SyQuest's long-time rival in the removable-media market, announced last month that it plans to begin distributing SyQuest-compatible cartridges within the next three months. The 44- and 88-Mbyte cartridges were developed by Nomai S.A. of Avranches, France, which has been distributing them in Europe — despite a publicity campaign and a barrage of legal actions on the part of SyQuest — since late last year.

SyQuest, alleging theft of trade secrets and the potential for catastrophic damage to its drive mechanisms and media, filed suit against Nomai in the Superior Court of California here in December and won an order temporarily enjoining distribution of the French-made cartridges. But on April 14 a court-appointed referee effectively lifted that ban by denying a SyQuest motion for an injunction against sales of the disks until the completion of a trial in the case.

Following that decision, Iomega, which is based in Roy, Utah, announced that it had signed a binding letter of intent with Nomai to become the exclusive distributor of the Nomai cartridges worldwide, except in France, where Nomai will continue to market them. Iomega said it will launch the cartridges in the U.S. market as soon as it completes its own technical qualification of them.

"We want to make sure they are as good as or better than SyQuest's own cartridges," said Michael Joseph, Iomega vice president of strategic marketing. He said pricing has not been determined, but "neither of us will make money if we get into a price war."

SyQuest, meanwhile, intensified its legal and publicity campaign against the Nomai cartridges, filing a complaint with the International Trade Commission in Washington, D.C. The Fremont, Calif.-based manufacturer said it has already won an injunction barring import and distribution of the Nomai cartridges in Germany, and it is seeking a similar order in the United Kingdom.

Among other charges, SyQuest alleges that Nomai's cartridge design, packaging and logo are designed to disguise the fact that the contents are what it calls "counterfeit" products. SyQuest showed a Nomai package for a 44-Mbyte cartridge: The SyQuest name appears in large letters on the front, but Nomai is not mentioned.

The stakes for SyQuest are high: Last year 55 percent of its revenues and a much larger proportion of its earnings came from cartridge sales. Sources said the company is considering making changes to its drives to ensure that they will accept only SyQuest-built disks.

Grants from the French government helped finance development of the Nomai cartridges. The company is headed by Marc Frouin, who was previously executive vice president of another French company, Chess S.A.; he helped run the now-defunct Jasmine Technologies Inc. on behalf of Chess in 1990-91. □

Tests show Nomai media could damage both drives and data, SyQuest charges

Having lost, at least temporarily, its bid to have a California court block U.S. distribution of Nomai S.A.'s cartridges, SyQuest Technology Inc. last week launched a publicity blitz aimed at convincing its customers that the French-made removable disks could damage their drives and data.

The company released results of tests conducted for it by two Silicon Valley testing services. According to SyQuest, Quanta Laboratories of Santa Clara, Calif., randomly selected 40 44-Mbyte and 40 88-Mbyte Nomai disks from lots purchased on the open market in Europe and compared them with a similar number of SyQuest-built cartridges.

Of the Nomai cartridges, the report said, "28 percent failed due to grinding, screeching, breaking or similar serious conditions." None of the SyQuest disks failed the Quanta testing.

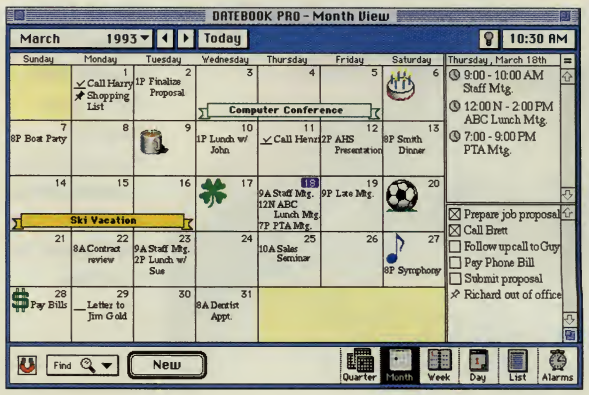
Surface Science Laboratories of Mountain View, Calif., then disassembled 13 of the failed Nomai cartridges and found metal shavings or burrs in 12 of them, according to the SyQuest statement. Such contamination could damage not only the cartridge but also the drive heads, which in turn could cause damage or data loss on other cartridges, SyQuest said.

A SyQuest-made video for press and analysts offers further details about the alleged problems. It shows Nomai disks failing to spin up properly, loud grinding noises under several circumstances and the hub of one of the French-made disks slipping out of place when the cartridge is dropped.

SyQuest officials also said that only they have sufficient familiarity with engineering changes to their drives and cartridges since their introduction in 1988 to ensure complete compatibility.

An official of Iomega Corp., which intends to distribute the Nomai cartridges after completing its own technical qualification process, said that the French company has shipped tens of thousands of its cartridges since last fall and that fewer than one in 1,000 has been returned because of failure.

He also said that Iomega, which has updated its own Bernoulli drives repeatedly over the past decade, "knows as much about backward compatibility and interchangeability as anyone, and we won't ship these cartridges until we're confident they're 100 percent compatible." — *By Henry Norr*



After Hours added color icons and banners as well as a detachable icon palette to Datebook Pro, its calendar program.

After Hours releases Pro versions of PIMs integrated via Apple events

By Kirsten L. Parkinson

Van Nuys, Calif. — Touchbase and Datebook turned Pro last week, but that doesn't mean customers will have to pay more to play with the After Hours Software personal information managers.

The company not only revised the names of its contact manager and calendar application — Touchbase Pro instead of TouchBASE and Datebook Pro instead of DateBook — but also slashed their prices. Previously $125 each, the programs now list for $79.95 but are available through a company-sponsored 800 number for $49.95 each; a bundle of both programs is $149.95 or $89.95 via the toll-free line.

The new versions feature tighter integration via the personal information suite of Apple events. Selecting a name and clicking a button in Datebook now opens a Touchbase window that not only displays information about the contact but also can include buttons for dialing phone numbers, printing letters or faxes, or searching the database. From within Touchbase Pro, on the other hand, users can view all the Datebook events related to a specific contact and add or edit calendar entries.

"They've beefed up the integration considerably," said Bob Leeds, vice president of Personal Computer Peripherals Corp. of Tampa, Fla. "It's much less obvious that you're in two different products."

- **Touchbase Pro.** A built-in word processor lets users create quick letters for mail merge from their contact database. A synchronization feature automatically reconciles differing copies of a user's database. New data-entry aids include pop-up selection menus and a Shortcut function that automatically completes a word after the user types in a few letters.
- **Datebook Pro.** With a hot key, users can at any time open a mini version of Datebook, where they can add events, to-dos, memos and alarms. A memo feature lets users add notes to any date without linking them to an event or to-do item, while a Days Overdue option tracks how late to-do items are. Other new capabilities include a print-preview option, color icons and banners, a detachable palette, and word-wrap capabilities.

"Data entry is very intelligently handled," Leeds said. "You can enter data from almost any place with a minimal amount of typing."

Upgrades are $24.95 for either program or $39.95 for both.

After Hours Software is at Tri Center Plaza, 5990 Sepulveda Blvd., Van Nuys, Calif. 91411. Phone (818) 780-2220 or (800) 367-8911; fax (818) 780-2666. □

Mannesmann delivers portable PS printer

By Matthew Rothenberg

Kent, Wash. — Mobile Mac users with a yen for printing PostScript on the road can turn to a new portable printer from Mannesmann Tally Corp.

The MobileWriterPS, available now for $999, weighs in at 8.3 pounds and measures 11.4 by 8.7 by 2.3 inches. It features a proprietary 6-page-per-minute, 300-dpi thermal-transfer engine that prints to letter-, legal- or A4-size paper or transparencies.

The printer ships with a PostScript Level 1 interpreter that the company licensed from Microsoft Corp., as well as PCL 4 emulation, and it includes 35 Type 1 fonts. Users can switch between LocalTalk and Centronics parallel interfaces via a DIP switch; automatic switching between language emulations is available only through the parallel port. The printer is compatible with Apple's LaserWriter driver.

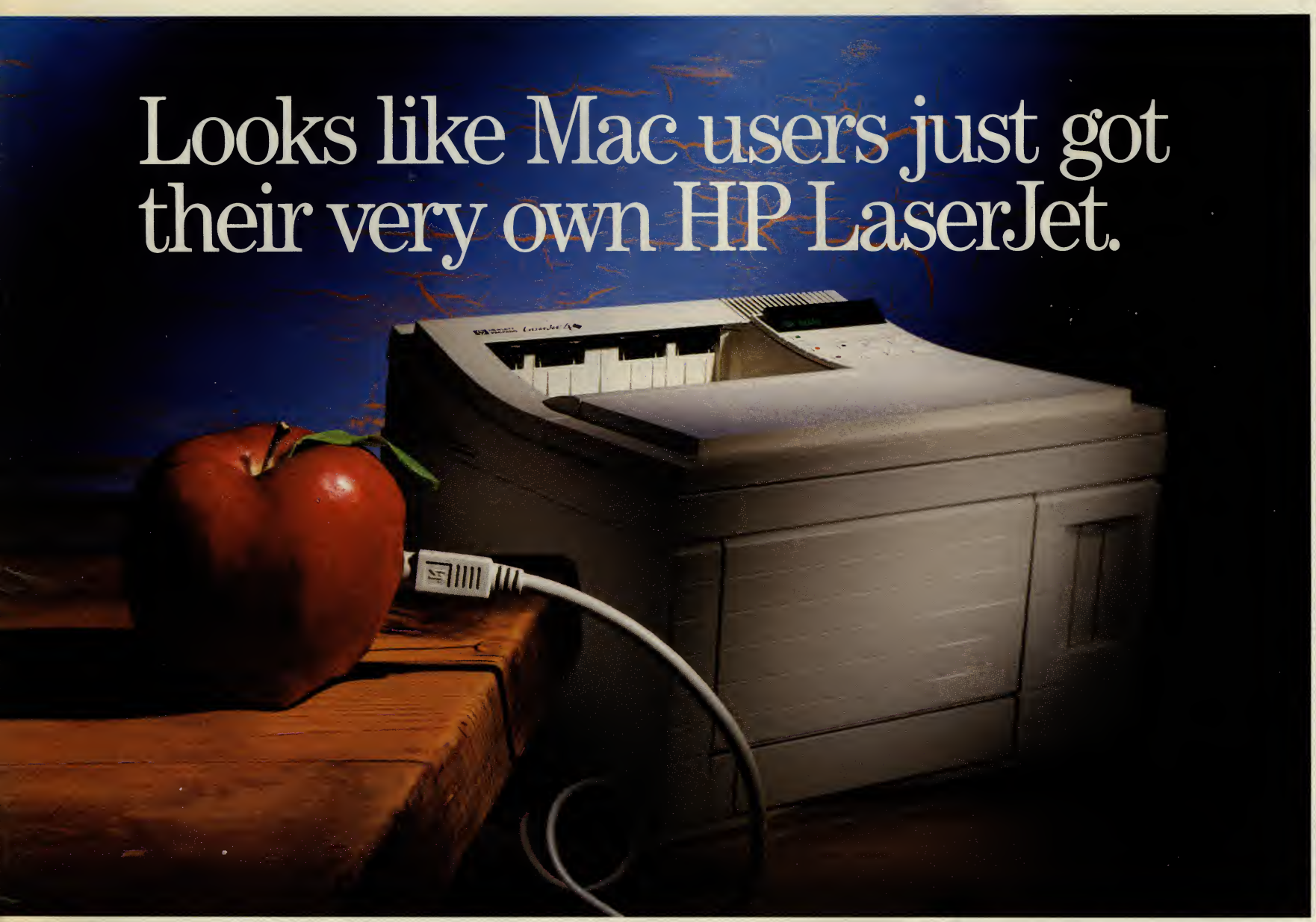
The MobileWriterPS comes with a 16-MHz 68000 processor. It ships with 2 Mbytes of RAM, which cannot be expanded.

The printer also includes an 80-sheet paper feeder, an AC adapter and a rechargeable nickel-cadmium battery. The company said each battery charge and wax-transfer ribbon is good for 150 pages.

Mannesmann Tally offers a 6-foot printer cable for $18 and a carrying case for $50.

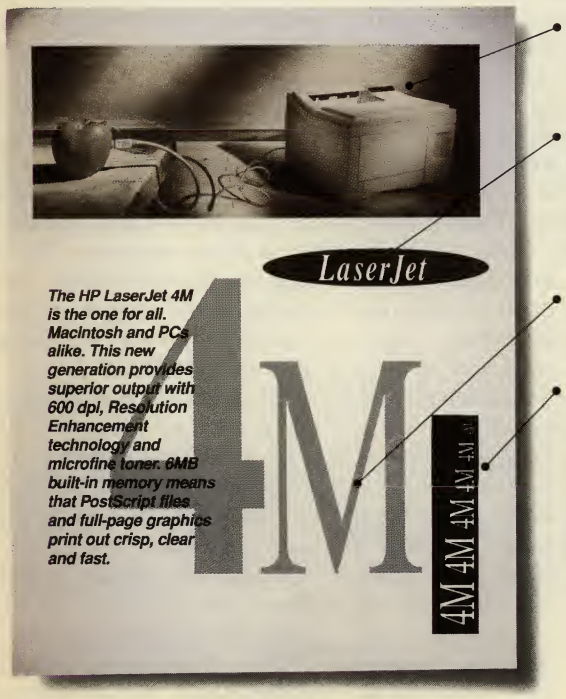
Mannesmann Tally Corp. is at 8301 S. 180th St., P.O. Box 97018, Kent, Wash. 98064-9718. Phone (206) 251-5524 or (800) 843-1347; fax (206) 251-5520. □

Looks like Mac users just got their very own HP LaserJet.



The new generation HP LaserJet 4M printer.

At last. An HP laser printer built specifically for the Mac—the new LaserJet 4M. A laser printer with everything Mac users need. From built-in PostScript™ Level 2 software from Adobe™ to standard LocalTalk and optional EtherTalk.



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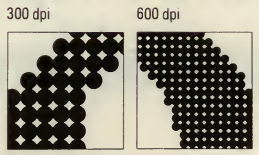
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FileRunner gets in sync with Mac

Package synchronizes files on multiple Macs

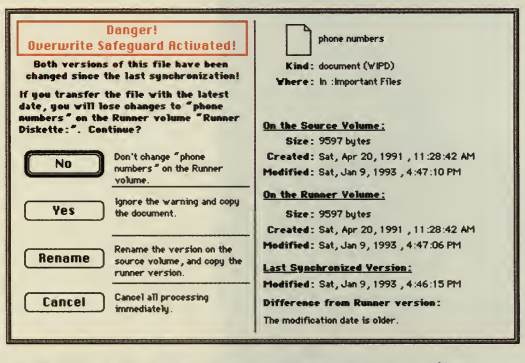
By Robert Hess

McMurray, Pa. — MBS Technologies Inc. last month shipped a Mac version of FileRunner, a file-synchronization package previously available only for DOS machines.

FileRunner for the Mac maintains parity among any number of Macs; synchronization can take place either one way or bidirectionally. Other utilities synchronize only two Macs or volumes, such as a desktop model and a PowerBook.

MBS said FileRunner could be useful, for instance, for network administrators to distribute files to clients on a network. The users, in turn, could update shared information on the server.

"I found FileRunner to be very easy and straightforward," said Mark Lentczner, a general partner at Glyphic Technology of Mountain View, Calif. "It always says exactly what it's going to do and gives you veto power before it does it. Even on my LocalTalk network, FileRunner is very fast. I even use it as my de facto backup software."



FileRunner's Overwrite Safeguard prevents users from inadvertently overwriting important older files, giving the user control over what action is taken.

Users can flag any subsection of a volume for synchronization. Andy Witkin, a computer science professor at Carnegie-Mellon University in Pittsburgh, said: "I looked at other packages and didn't like the fact [that] they wanted to scan the complete contents of both synchronized volumes. I only want a part of my disk synchronized, and I really liked the speed with which I could get a synchronization completed."

An Overwrite Safeguard feature warns users if the same file has been changed on more than one computer. The program can also synchronize deletions, so files thrown away from a synchronized source volume will also be removed from target systems.

FileRunner creates a log of all transfers showing where the most recent version of a file was created, last updated or deleted.

Files that have been changed on the source computer can be saved, optionally in compressed form, to any mountable media for transfer or backup. Users can enable virus scanning during file transfer using Virex, Datawatch Corp.'s virus-scanning utility, which is bundled with FileRunner.

FileRunner can compensate for changes in time zones and can detect when Macs being synchronized have incorrectly set clocks.

FileRunner sells for $99.95; users may install and use the application on all Macs with which they work.

MBS Technologies Inc. is at 4017 Washington Road, No. 4000, McMurray, Pa. 15317. Phone (412) 941-9076; fax (412) 941-7076. □

Mr. File learns new ways to search, copy in background, foreground

By Robert Hess

San Jose, Calif. — Softways last month shipped Version 2.0 of Mr. File, improving the file-management utility's performance and adding new options for searching and copying.

Mr. File copies, erases and searches for files in the foreground or background. Version 2.0 lets users switch at a keystroke among several copying modes: A Turbo mode completes the task in the foreground at maximum speed, while three background options offer different trade-offs between speed and effect on other applications.

The program now offers network copying in the background over both LocalTalk and AppleTalk Remote Access (ARA). Mr. File 2.0 can be set to sever an ARA connection automatically when copying is complete.

When conflicts occur, such as the same file in both a destination and source, the new version offers a variety of choices, including an update option that replaces only older files and a two-way synchronization option that puts the newest version of all identically named files into both source and destination folders.

Users can search for files by name, date modified or created, type, creator, kind, size, label, and locked and invisible states. Search results appear in a list from which items can be opened, copied, moved, renamed, erased, aliased or have their file information set. Search criteria can be saved for reuse.

Mr. File can quickly find and delete duplicate items; it can also find and delete aliases for which the original file no longer exists.

A log now keeps track of jobs and errors. Unlike similar utilities, Mr. File 2.0 can set file or folder information on several items at once. The selection-list windows have been revamped and now remember copy destinations so routine tasks can be automated.

Mr. File 2.0 can copy files compressed with Fifth Generation Systems Inc.'s AutoDoubler utility. Its displays can be configured to show compressed files as AutoDoubler files at their compressed size or as normal Mac files at their decompressed size.

Mr. File 2.0 can read and write comments attached to files by CE Software Inc.'s DiskTop, a competing product. Softways is offering a sidegrade to DiskTop owners for $39.

Upgrades are free.

Softways is at 5066 El Roble, San Jose, Calif. 95118. Phone (408) 978-9167; fax (408) 448-0620. □



GCC's new 8- and 4-page-per-minute BLP Eclipse printers are based on 300-dpi Oki engines that provide edge-to-edge legal-size output.

New GCC Level 2 printers output edge-to-edge legal-size pages

By Matthew Rothenberg

Bedford, Mass. — GCC Technologies Inc. last week turned the spotlight on a new line of Level 2-compatible 300-dpi printers that offer edge-to-edge legal-size output and a variety of network options.

The BLP Eclipse line is available now in 8-page-per-minute and 4-ppm configurations, which are priced at $1,799 and $1,399, respectively. Both models are based on LED engines from Oki Electric Industry Inc. of Tokyo. They print to letter-, legal-, A4- or B5-size paper or film, as well as labels and envelopes. The 8-ppm printer includes image-enhancement algorithms developed by GCC and Oki to smooth the edges of text and graphics.

Each model ships with the Level 2 version of PhoenixPage, the PostScript interpreter from Phoenix Technologies Ltd. of Norwood, Mass. The 4- and 8-ppm configurations include 17 and 35 Type 1 fonts, respectively.

Both printers offer automatic switching among LocalTalk, RS-422 serial and parallel ports; the 8-ppm configuration also ships standard with EtherTalk.

Each device includes a 16-MHz AMD 29200 RISC chip and 2 Mbytes of RAM, which can be increased to 6 Mbytes. The printers provide a straight-through paper path and come with a 200-sheet multipurpose paper tray; a lower paper-tray assembly that accommodates 200 letter- or legal-size pages is $329.

GCC Technologies Inc. is at 209 Burlington Road, Bedford, Mass. 01730-9143. Phone (617) 275-5800; fax (617) 275-1115. □

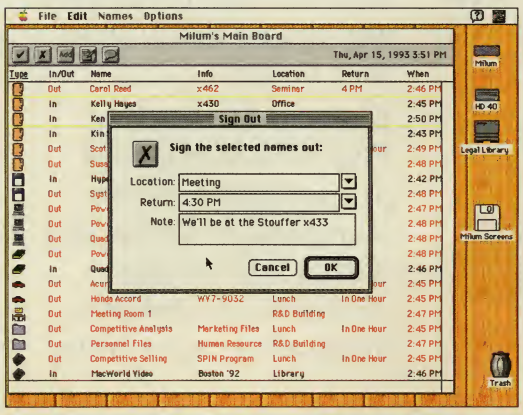
Office Tracker supports AOCE, remote access

By Ian G. Jacobs

Austin, Texas — Milum Corp. this week will ship Version 1.1 of its electronic in/out board with enhanced security and support for AOCE and remote access.

Office Tracker lets users track the whereabouts of employees and equipment. The program, which is System 7-dependent, uses Apple events to handle client-server communications. New features include:

- **Security.** Users will no longer be able to sign each other in and out. Now only designated users can control the in/out status of other employees. All users will still be able to change the status of office resources.
- **Notification.** Users running AOCE (Apple Open Collaboration Environment), Apple's forthcoming messaging extensions, can be notified of in/out activities through AOCE messaging devices, such as electronic mail and digital pagers, regardless of whether Office Tracker is running.
- **Remote access.** The program now allows for remote sign in/out via AppleTalk Remote Access. Office Tracker will remember the phone number used and connect automatically when users sign in/out.



Office Tracker 1.1 now allows only specially designated users to change the status of people on the electronic board.

Other new features include automatic log-on to all boards opened at the previous session and menu access to currently available in/out boards.

Truevision Inc. of Indianapolis uses the program to organize the payroll for its hourly employees. "We just dump the logs from Office Tracker into the payroll," said Bob Luedeman, Truevision network administrator. "It's a real powerful tool."

Milum said Version 2.0, due this summer, will add a Windows client, support for AppleScript and annotation with voice notes. The company also plans an add-on group scheduling module.

A single-user version is $195, a 20-user pack is $495, and a 50-user pack is $995. Upgrades are free.

Milum Corp. is at P.O. Box 163985, Austin, Texas 78716-3985. Phone (512) 327-2255 or (800) 257-2120; fax (512) 328-9824. □

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Apps go Mac to Windows and back

Altura porting tools work both directions

By Robert Hess

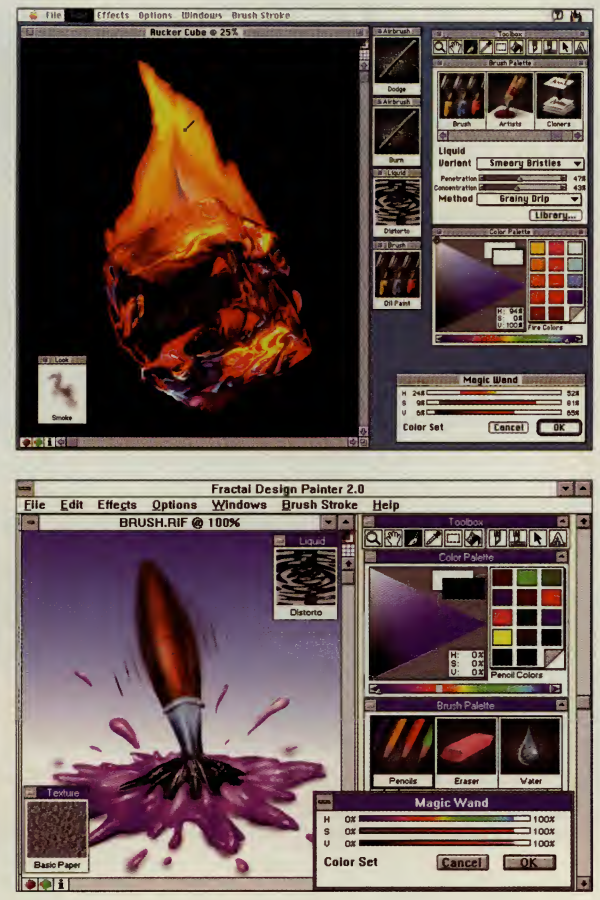
Pacific Grove, Calif. — With the old lines dividing platforms eroding each month, attendees at the Apple Worldwide Developers Conference in San Jose, Calif., next month will be taking a close look at a growing line of Mac-Windows porting tools from Altura Software Inc.

The company will not only show Mac2Win, its Mac-to-Windows porting tool kit, but also announce Win2Mac, a reverse porting tool for Windows developers who want to bring their products to the Mac. And it will demonstrate a new Mac Help viewer, due in June, that will let Mac applications incorporate Help files written for Windows' highly regarded Help system.

Mac2Win, a Windows Dynamic Link Library, maps Macintosh Toolbox calls to Windows equivalents. In addition, it can convert a Mac application's resource fork into a Windows file to help developers port custom resources.

Altura originally developed the software for its conversion consulting work but began offering it to outside developers late last year.

Fractal Design Corp. of Aptos, Calif., said it used Mac2Win to create the Windows version of its Painter color painting application. Tom Hedges, Fractal vice president of research and development, said Mac2Win altered the course of his company, "allowing us to stay mainly a Mac shop while still developing quality Windows applications."



Altura's Mac2Win accelerated Fractal Design's conversion of Painter to Windows, guaranteeing both platforms' interfaces are nearly identical. The Mac version at the top was converted to produce the Windows version shown at the bottom.

Applications created with Mac2Win deliver performance comparable to traditionally developed Windows applications, according to Altura.

Mac2Win supports about 850 of the approximately 1,100 Mac Toolbox calls. Some, like those supporting System 7's balloon help, Apple events and QuickTime, are disabled, but many are fully emulated in Windows.

For $2,000 per month, developers can evaluate Mac2Win. If they are not satisfied, they can return the package and have their money returned; if they decide to purchase the package, they then must negotiate licensing agreements and fees with Altura. Developers can also contract with Altura to convert their code.

Altura Software Inc. is at 510 Lighthouse Ave., Suite 5, Pacific Grove, Calif. 93950. Phone (408) 655-8005; fax (408) 655-9663. □

MicroMat's MicroProbe device tests ADB chains

By Robert Hess

Novato, Calif. — Why send out your Mac for service when you can fix it, or at least diagnose it, yourself? MicroMat Computer Systems this month will go beyond its Mac-testing software with the first product in a new line of hardware testing devices.

The MicroProbe ADB tests many attributes of the Apple Desktop Bus chain that links a Mac to keyboards, mice and other pointing devices. The $99 device can diagnose faulty ADB components such as the fuse, filter and chips; test cables and connectors; and monitor ADB communications for logic problems.

A test with the handheld, cylindrical device takes 10 seconds. The MicroProbe ADB can diagnose any Mac with a functioning power supply, even nonbootable CPUs.

The company said most Mac ADB failures can be traced to a 50-cent blown fuse on the logic board. While many technicians replace the entire board when an ADB problem is detected, MicroMat said users can replace just the component if MicroProbe ADB determines it is at fault.

MicroProbe ADB requires no external or internal power and no software. A small reference card included with the package explains the device's audiovisual feedback.

MicroMat Computer Systems is at 7075 Redwood Blvd., Bay 4, Novato, Calif. 94947. Phone (415) 898-6227; fax (415) 897-3901. □

Extension prints electronic watermarks

Santa Cruz, Calif. — Working Software Inc. last week announced a system extension that lets users place a graphic or text behind a document when printing.

Due by June for $49.95, Working Watermarker adds controls to Print dialog boxes that let users select Encapsulated PostScript or PICT graphics from either files or the Clipboard. It ships with a set of common watermarks and works with both PostScript and non-PostScript printers.

The first page can have a different graphic and different printing intensity from subsequent pages.

Working Software Inc. is at P.O. Box 1844, Santa Cruz, Calif. 95061-1844. Phone (408) 423-5696 or (800) 229-9675; fax (408) 423-5699. □



News BRIEFS

Fujitsu enters retail market with DynaMO

San Jose, Calif. — Fujitsu Computer Products of America Inc. last week took the plunge into the retail market with the shipment of an external magneto-optical drive.

The $1,225 DynaMO has a 1-inch-high, 3.5-inch mechanism and offers a capacity of 128 Mbytes per cartridge. According to Fujitsu, the DynaMO is the only 1-inch-high optical drive currently available.

The drive has an average seek time of 30 milliseconds and a sustained data transfer rate of 768 Kbytes per second.

The DynaMO ships with a one-year warranty and one cartridge. Additional cartridges list for $55.

In the past, Fujitsu's storage products have been available as OEM devices or through mail-order companies. The growing popularity of optical drives and the company's desire to be a major player in that market led it to develop a product for the retail channel, Fujitsu said.

Fujitsu Computer Products of America Inc. is at 2904 Orchard Parkway, San Jose, Calif. 95134. Phone (408) 432-6333 or (800) 626-4686; fax (408) 894-3606.

MacLinkPlus/Translators volume bundles offered

Trumbull, Conn. — DataViz Inc. is now offering volume bundles of MacLinkPlus/Translators, its file-translation utility. The utility includes more than 700 translation combinations to convert word processing, graphics, spreadsheet and database files.

A five-pack is $439, a 10-pack is $765, and a 25-pack is $1,635. Individual copies remain priced at $165.

Each copy comes with Apple's Macintosh Easy Open, a system extension that makes file translation transparent to the user, and Apple's Macintosh PC Exchange, which allows DOS disks to be read by a Mac SuperDrive.

DataViz Inc. is at 55 Corporate Drive, Trumbull, Conn. 06611. Phone (203) 268-0030 or (800) 733-0030; fax (203) 268-4345.

RasterOps drops price of color display adapter

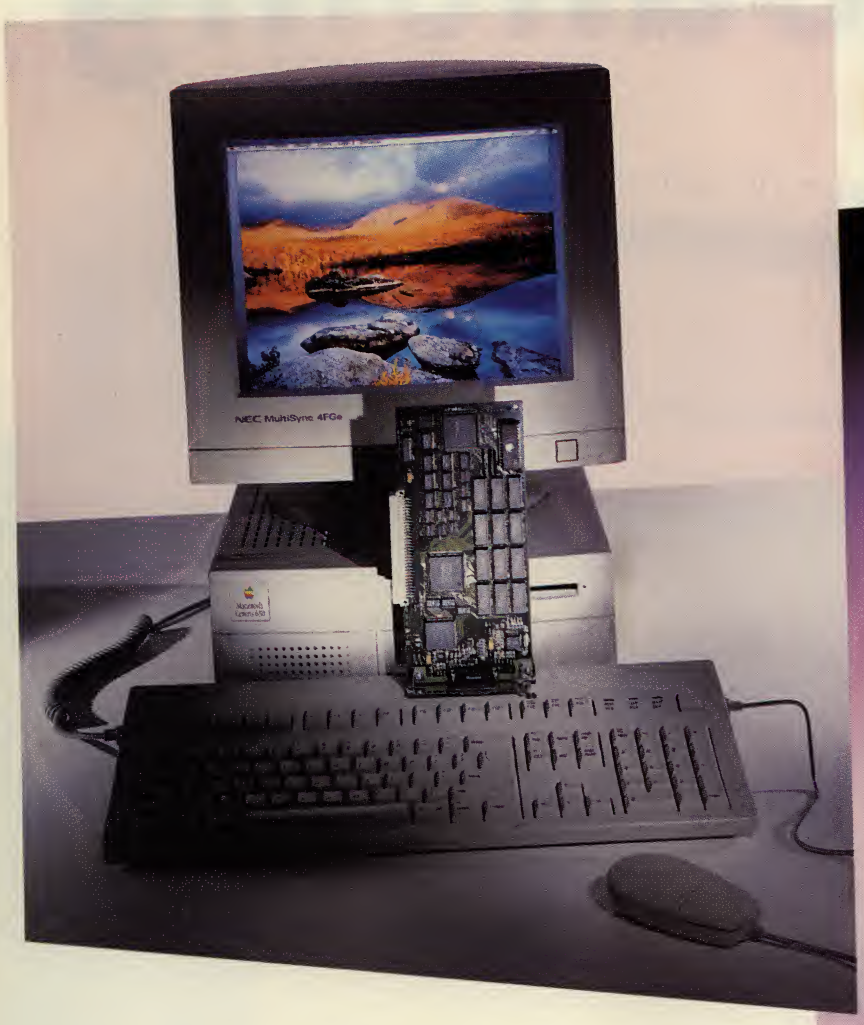
Santa Clara, Calif. — RasterOps Corp. last month dropped the price of its 24Mx 24-bit-color NuBus display adapter by 47 percent.

The card is now $799, down from $1,499. It provides QuickDraw acceleration up to 600 percent and supports a maximum resolution of 832 by 624 pixels on 16-inch monitors and 640 by 480 pixels on 13-inch monitors.

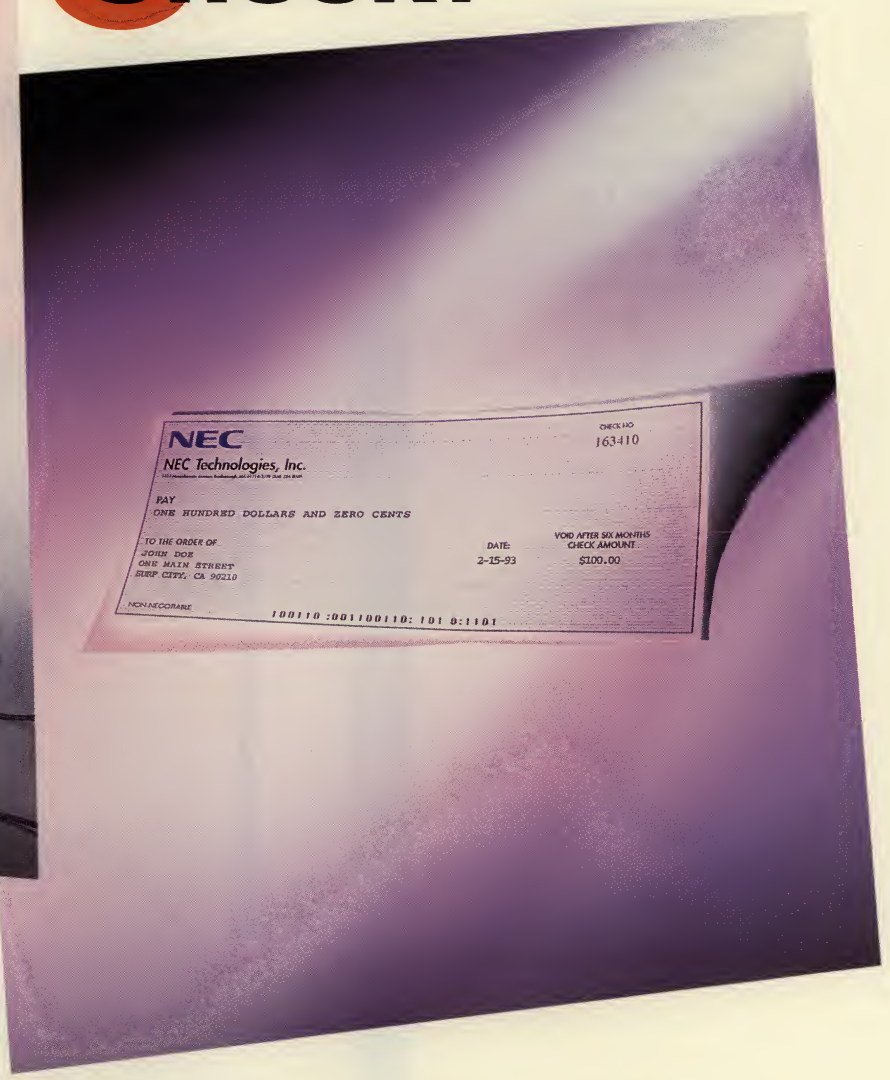
RasterOps also dropped the price of its Sweet 16 System, which bundles the card with the RasterOps Sweet 16 display. Previously $2,499, the system is now $2,149.

RasterOps Corp. is at 2500 Walsh Ave., Santa Clara, Calif. 95051. Phone (408) 562-4200 or (800) 729-6567; fax (408) 562-4065.

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The MacFG 24Xp is a great deal. And it's even better now since it's only $399 after the rebate.**

Multiple resolutions and more. The 24Xp maximizes the MultiSync monitor's performance for all your advanced graphics needs. It gives you incredible photo-realistic color, includes built-in QuickDraw™ acceleration and it is designed to maximize the FullScan™ dimensions of MultiSync monitors. Moreover, its switch-on-the-fly capability allows easy switching of display modes without restarting your system.

For promotion details. See your NEC dealer or call 1-800-NEC-INFO. For information via fax, call NEC FastFacts™ at 1-800-366-0476, request document 11 and 349701. If you're thinking of buying a 24-bit color card from someone else, you really *do* need a Reality Check!

Because ⬆ is the way you want to go.

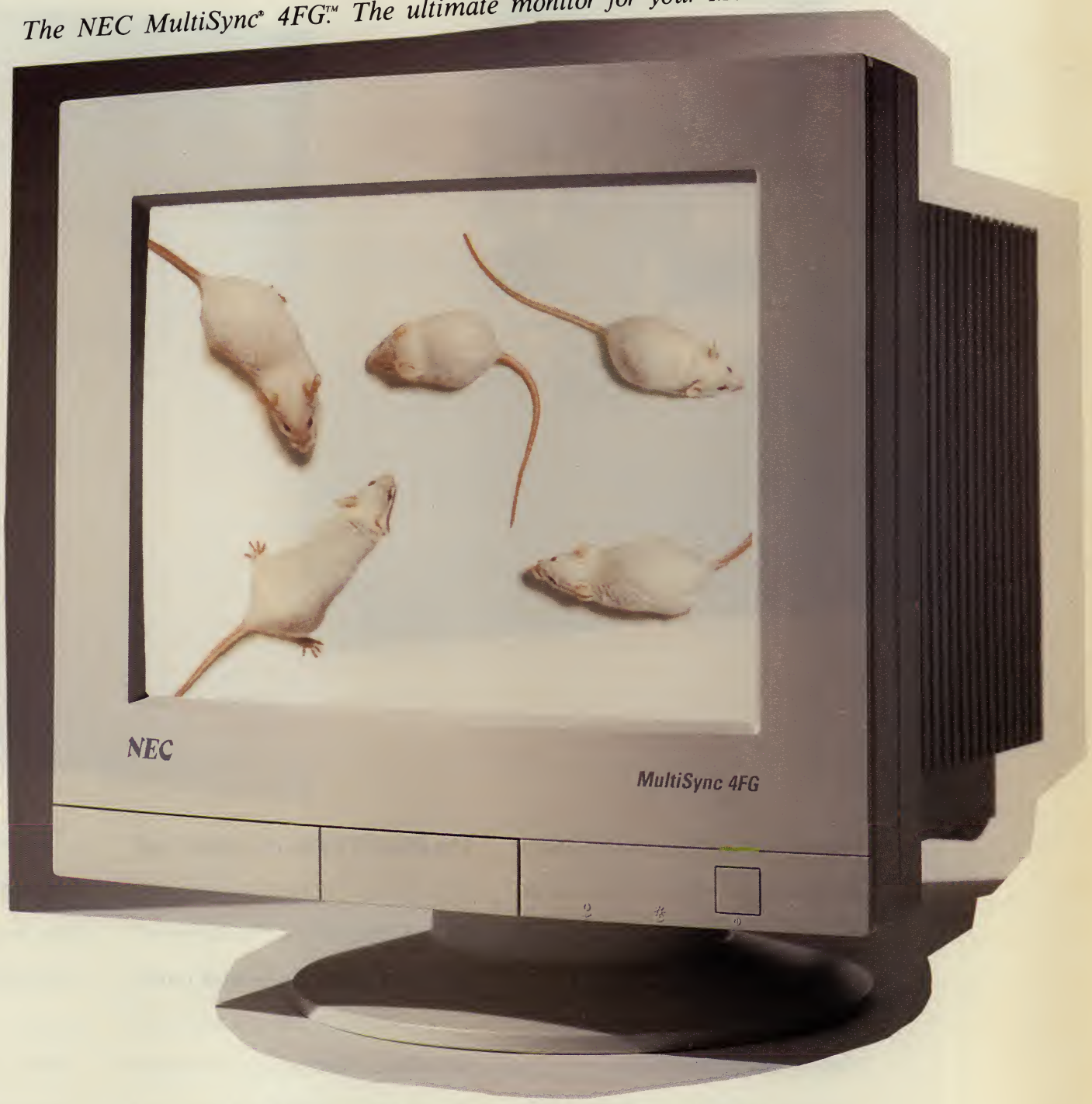
NEC

*To take advantage of this offer, you must already own a 15″ or 17″ MultiSync FG or FGe monitor or purchase one by June 30, 1993. Redemption forms must be postmarked by 7/15/93. **Manufacturer's estimated selling price after rebate. MultiSync is a registered trademark and FG, MacFG, FGe, FullScan and FastFacts are trademarks of NEC Technologies, Inc. All other trademarks are the property of their respective owners. © 1993 NEC Technologies, Inc.

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The NEC MultiSync® 4FG.™ The ultimate monitor for your Macintosh®.

***At NEC, we've developed** hundreds of computer products expressly for Mac systems: from our highly-acclaimed MultiSync monitors, MultiSpin™ CD-ROM readers and Silentwriter® laser printers, to our Professional Graphics Series, which includes our new 27" MultiSync 3PG data monitor and MultiSync 6PG and 9PG Projection Monitors for images as large as 25 feet.*



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–MacUser Magazine Aug.'92

better mousetrap.

The NEC MultiSync® 3FGx™ monitor.

The least you should do for your Mac®.



In 1992, the only monitor to snag the coveted five-mice rating was an NEC monitor: the MultiSync 4FG. After running it and 13 others through the most rigorous technical evaluation they'd ever used for testing monitors, *MacUser* magazine concluded, "If you're looking for the sharpest display, the NEC MultiSync 4FG should be your top choice." What more can we say? Glad you asked.

Our AccuColor™ Control System prompted *MacUser* to make special mention of the "easy color adjustments." AccuColor lets you adjust on-screen colors, so if you're looking for mouse-tail pink, that's what you'll get.

If, however, color control is not a priority for you, you'll be very happy with NEC's MultiSync 3FGx monitor, which shares almost all of the 4FG's award-winning features. Both monitors produce sharp, bright images, crisp graphics and vibrant colors. An Invar shadow mask provides increased brightness without loss of focus.

Another big idea—the display area. The large 15″ screen (13.8″ active display area) coupled with FullScan™ capability for edge-to-edge images gives you a larger display area than typical 13″ or 14″ RGB monitors.

How do you make an NEC MultiSync monitor work with your Mac? Just plug it in, using NEC's free FG/Mac cable adapter. It works with the Mac's on-board video, so you won't need an add-in video board.*

Both monitors are compatible with the Mac® II family, Quadra™ series, LC's, PowerBooks™ and PC systems. So you can use just one monitor for both types of platforms. *MacUser* noted the "powerful and versatile controls make switching from a Mac to a PC a snap."

And to make these monitors as user-friendly as possible, we've included ergonomic features such as a tilt/swivel base and up-front user controls. Plus, our Reduced Magnetic Field™ technology meets the strict Swedish MPR II guidelines for magnetic field emissions.

There are lots of reasons for considering an NEC MultiSync monitor for your Mac—the sharp, bright images, the vibrant colors, the large display area, the flexibility, the compatibility—to name five. And the  to name five more.

For more information on our award-winning monitors, call 1-800-NEC-INFO (in Canada: 1-800-343-4418). Or for a complete brochure via fax, call NEC FastFacts™ at 1-800-366-0476, request #62234.

*For Macintosh 640 x 480 resolution, just attach NEC's FG/Mac cable adapter and plug into: Macintosh IIsi, IIci, LC, LCII, IIvx, IIvi, Quadra™ 700, Quadra 900, Quadra 950, Performa™ 400, Performa 600, PowerBook™ 160, PowerBook 180, and the PowerBook 210 and PowerBook 230 with either the DuoDock™ or MiniDock.™ Or with an add-in video card: Macintosh II, IIx, IIcx, IIfx, PowerBook 140, PowerBook 145, and PowerBook 170. Get the 640 x 480 FG/Mac adapter free by calling NEC at (312) 622-7427 8:30AM-5PM CST.

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Remus lets users turn existing drives into RAIDs

Trillium software offers RAID levels 0, 1, 4, 5

By Kirsten L. Parkinson

Hudson, Wis. — Trillium Research Inc. this month will release Remus, a Mac application that lets users configure their hard drives as RAID systems.

Users can create an unlimited number of partitions and configure them as RAID (redundant array of inexpensive disks) levels 0, 1, 4 and 5. A single partition can include as many as 15 drives, and partitions within a single drive can be assigned different RAID levels.

Level 0 stripes data across several disks, reducing access times and increasing throughput, while Level 1 produces a duplicate copy of data through disk mirroring.

RAID levels 4 and 5 write parity information so data on a failed drive can be reconstructed. One whole drive stores parity information in Level 4, and Level 5 distributes parity information across all the drives.

Remus incorporates a user-notification feature that employs dialogs, blinking Apple icons and sounds to alert users when a drive fails. The program also includes built-in support for NetWorks 3.0, a network-monitoring application from Caravelle Networks Corp. (see story, Page 28).



Remus from Trillium Research lets users create partitions on their hard drives and configure them as RAID levels 0, 1, 4 or 5.

The advantage of Remus over complete RAID hardware systems, according to Trillium, is that it allows users to employ drives and SCSI cards from the manufacturer of their choice or to turn their existing drives into RAID systems.

However, unlike some RAID systems, Remus does not support hot swapping, which allows users to replace a failed drive without turning off the system.

The program requires a Mac with a 68020 or higher processor, System 7, 4 Mbytes of RAM, and two or more disk drives in addition to the system drive.

Remus sell for an introductory price of $695; the permanent price is not set.

Trillium Research Inc. is at 220 Locust St., Hudson, Wis. 54016. Phone (715) 381-1900; fax (715) 381-1901. □

Exabyte branches out with DAT, QIC drives

By Henry Norr

Boulder, Colo. — Exabyte Corp., which earned its reputation in the backup market as the exclusive manufacturer of 8-millimeter tape systems, last month marked two milestones in its effort to diversify into other tape technologies.

The company said it has begun shipping a new digital audio tape drive with built-in compression and its first quarter-inch tape system. The new products will be marketed through Tallgrass Technologies Corp. of Lenexa, Kan. (an Exabyte subsidiary), and other OEM customers.

▶ **Compression DAT.** The EXB-4200c, a DAT drive with compression built in, uses the standard DDS-DC format. In typical use, it can store about 4 Gbytes of data on a 90-meter tape. It supports transfer rates of up to 466 Kbytes per second and can locate any file on the tape in 20 seconds, on average, according to the company. Tallgrass said it will ship the product in July; pricing has not been set.

Exabyte's first DAT unit, the noncompression-based EXB-4200, began shipping in the first quarter. Both are based on technology from R-Byte Inc., a DAT developer Exabyte acquired last fall.

▶ **Quarter-inch tape drive.** Exabyte also shipped the EXB-2501, which it called the fastest, highest-capacity quarter-inch tape system in the industry. Using DC2750 minicartridges, the 3.5-inch drive can store 750 Mbytes of uncompressed data in 25 minutes, according to the company; with shorter DC2300 cartridges, capacity is 550 Mbytes. Tallgrass said an external version of the drive for the Mac, called the FS1G-Mac, will ship next month for $2,195.

Exabyte acquired the quarter-inch tape technology earlier this year when it purchased the assets of the Mass Storage Division of Everex Systems Inc.

Exabyte last month also added two new models to its line of auto-loaders for 8-millimeter tapes. The EXB-10e, an enhanced version of its 10-cartridge library system, offers random access to 50 Gbytes of data when configured with the EXB-8500 tape drive; with the EXB-8500c, which has compression built in, typical capacity is 100 Gbytes. The company said the new unit provides more-reliable robotics and a new security key lock. It is expected to sell to users for between $15,000 and $20,000.

The EXB-60, a new model that can be configured with two tape drives, handles as many as 60 cartridges, with 300 Gbytes of uncompressed data or 600 Gbytes with compression. The price to end users is expected to be between $75,000 and $85,000. □

Transoft is RAID-ing the storage market with the help of AT&T

By Kirsten L. Parkinson

Santa Barbara, Calif. — The name Transoft Corp. may not ring any bells with most Mac users, but that can't be said of the partner helping it bring its DataDock disk arrays to market — AT&T Co.

Transoft designed the arrays, but the NCR division of AT&T is manufacturing them and helping to fund the project, Transoft said.

The DataDock T-1000 holds up to five 3.5-inch drives for a total capacity of up to 10 Gbytes. A T-1000 tower with one controller, one power supply but no drives lists for $4,995.

The DataDock T-2000 can be configured with as many as 20 3.5-inch drives, six redundant power supplies and four controllers. A drive-ready tower with two power supplies and two controllers is $19,995. Drives are available directly from Transoft. A 500-Mbyte Seagate drive, for example, is $600. Both the T-1000 and T-2000 provide hot-swapping options, allowing users to replace a damaged drive without turning off the system. The T-2000 also offers hot-swapping options on the power supplies.

Both arrays ship with Transoft's RAID Manager software, which lets administrators control DataDocks anywhere on a network.

Transoft Corp. is at 31 Parker Way, Santa Barbara, Calif. 93101. Phone (805) 963-7181 or (800) 949-6463; fax (805) 963-7178. □

Mercury adds drives to removables line

By Kirsten L. Parkinson

Beverly Hills, Calif. — Mega Drive Systems Inc. last month added two new high-capacity models to its line of 3.5-inch Mercury removable drives.

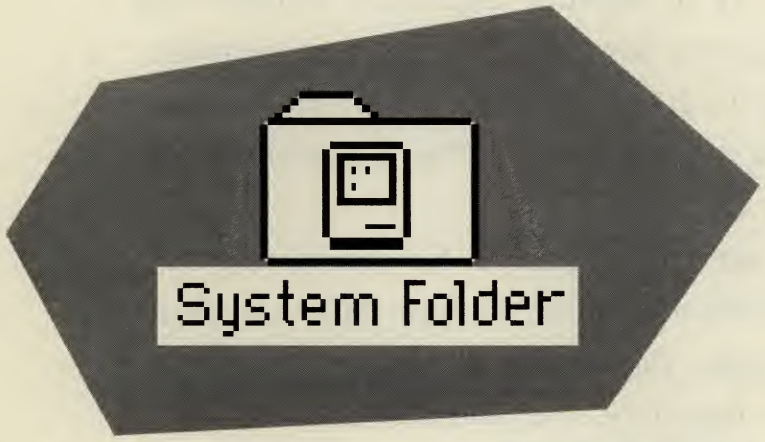
The $3,359 1.6-Gbyte Mercury, based on a Micropolis mechanism, offers an average seek time of 10 milliseconds, while the $4,599 2.1-Gbyte drive, based on a Seagate mechanism, has an average seek time of 9 milliseconds. Both models offer Fast SCSI-2 burst transfer rates of up to 10 Mbytes per second when used with a SCSI adapter card.

Mega Drive also cut prices by up to 28 percent on its current Mercury offerings, which include drives with capacities from 85 Mbytes to 1.2 Gbytes. For example, the 535-Mbyte Mercury drive now lists for $1,399, down from $1,919.95.

The Mercury drives can either fit into the company's disk arrays or be used in internal and external enclosures, which sell separately at prices ranging from $209.95 to $524.95.

Mega Drive last month shipped the MR/5, a five-drive RAID (redundant array of inexpensive disks) system that can hold as many as 10 Gbytes. Without drives, the MR/5 lists for $10,000. A 10-Gbyte capacity configuration is $33,000.

Mega Drive Systems Inc. is at 489 S. Robertson Blvd., Beverly Hills, Calif. 90211. Phone (310) 247-0006; fax (310) 247-8118. □



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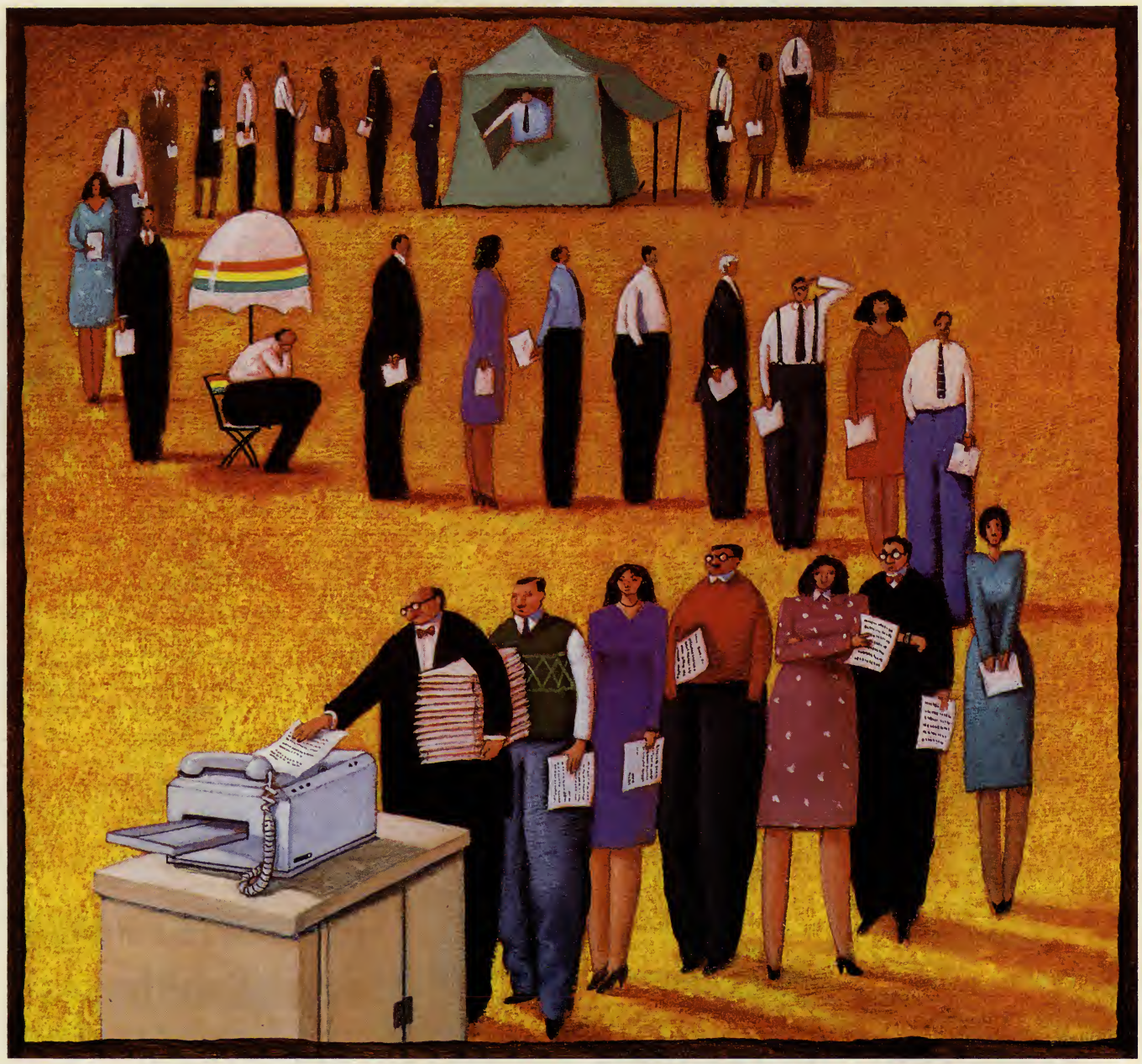
For more info, drop what you're doing and call the leader in Mac networking: 1-800-998-7760 ext. 7.

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Clearly, the inventors of the fax machine could have used a little *foresight*. Specifically, 4-Sight Fax™, the complete, multi-user, fax software solution from CommFORCE.

4-Sight Fax allows users on a network to send and receive faxes directly from their desktop. Simply create a document, preview it, and fax it. That's it! Your computer will automatically stand in line for you, dial and re-dial, queue up the next fax, and even give you a transmission receipt. And, incoming faxes can be viewed, stored on disk, or automatically printed.

4-Sight Fax works seamlessly with QuickMail™, delivering any message as both an E-mail message to someone on your network and a fax anywhere. Which means that for PC's and Macs, sending and receiving faxes through QuickMail is just as easy as sending and receiving your QuickMail messages.

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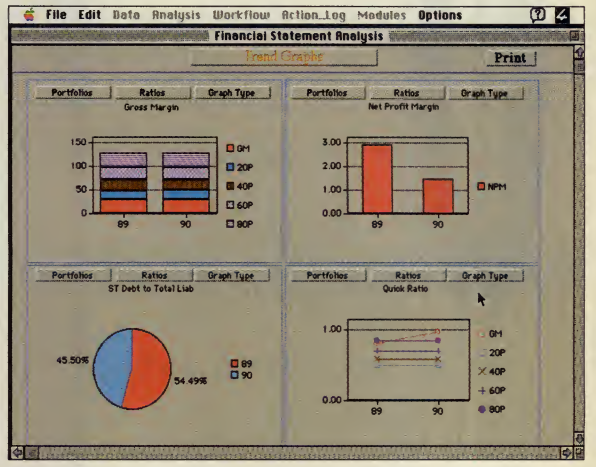
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SOURCE CODE 185.

Re-engineer-iT helps IS managers build road maps of their business

By April Streeter

Brookline, Mass. — SR Research Inc. next month will ship software for Apple's Workgroup Server 95 designed to help information-systems managers create and remodel mission-critical applications to respond to changing business needs.

Re-engineer-iT, which will cost about $5,000 for the server software and $300 per client, runs on the AWS 95's A/UX 3.0.1 operating system.



SR Research's Re-engineer-iT lets users visualize a company's work-flow data in a number of graphic forms.

The client software helps IS managers create a series of flowcharts that comprise a road map of a company's business processes. The flowcharts are connected to a rule-based expert system and database running on the server. According to SR Research, having a business model in this format allows shorter redevelopment and engineering cycles for in-house applications.

The client component of Re-engineer-iT lets users create rule-based agents that "watch" and catalog work-flow processes based on either local or server data. A database handles contacts, and an event log keeps track of the user's work flow.

The server component stores the model, manages events between users, and helps administrators construct decision trees and a variety of graphical charts to analyze the business model.

SR Research Inc. is at 167 Corey Road, Suite 210, Brookline, Mass. 02146. Phone (617) 734-0636; fax (617) 734-1228. □

Adambyte releases new powerboxes

By Henry Norr

Mountain View, Calif. — Adambyte, developer of the powerbox series of battery-backed mobile storage systems for use with PowerBooks, last month added several new configurations and reduced prices on its original models.

The new versions combine a 200-Mbyte Maxtor or Quantum hard drive or a 500-Mbyte Quantum mechanism with a floptical drive, which can hold as much as 21 Mbytes of data on a disk that looks like a 3.5-inch floppy. The two new configurations are priced at $1,449 and $2,399, respectively.

A powerbox with a 200-Mbyte hard drive and a 155-Mbyte Teac streaming-tape drive is now $1,599, down $300, while a system with the tape drive and a 500-Mbyte hard disk, previously $2,799, is now $2,449.

The powerboxes, which match the footprint and plastics of all-in-one PowerBooks, are designed to be placed under the Apple notebooks. They weigh less than 5 pounds each and come with an AC adapter and a PowerBook-compatible battery. The PowerBook can be attached to the powerbox and powered from it; when the box is connected to an AC source, both batteries are charged.

NovaMac, a backup utility from NovaStor Inc., is bundled with the powerboxes.

Adambyte is at 2672 Bayshore Parkway, Suite 1045, Mountain View, Calif. 94043. Phone (415) 988-1415; fax (415) 988-1418. □

FWB adds new drives, array to Hammer line

By Henry Norr

San Francisco — FWB Inc. last week added two new high-capacity drives and a new array to its Hammer line, and it reduced prices on several existing units.

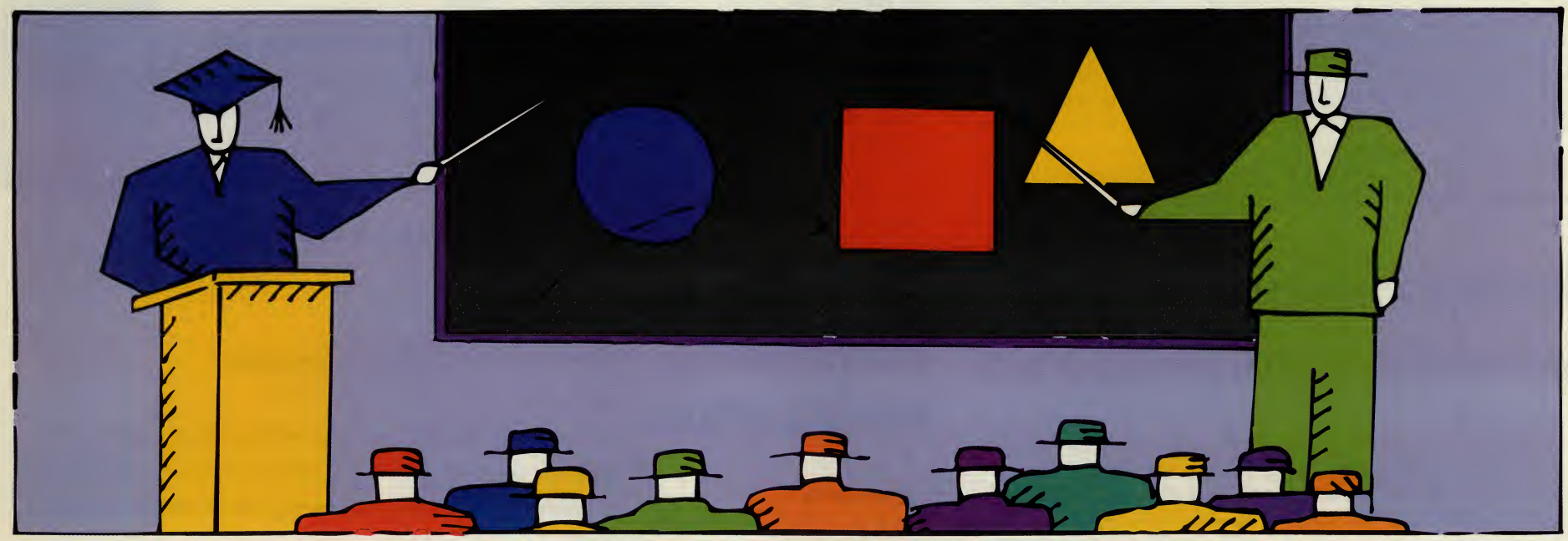
The new drives include:

- **HammerPB210,** an internal PowerBook drive with a capacity of 210 Mbytes. Priced at $869, the drive is based on a 2.5-inch Toshiba mechanism with an average seek time of 12 milliseconds. It comes bundled with FWB's Hard Disk ToolKit and Connectix Corp.'s just-released Connectix PowerBook Utilities 2.0.
- **Hammer1600FMF,** a 1.6-Gbyte drive with a 3.5-inch DEC mechanism with an average seek time of 9.5 milliseconds and a data transfer rate of up to 10 Mbytes per second. An external version is $3,099; the Hammer1600FMFis, an internal version that fits in the Mac II, Centris, Quadra and Apple Workgroup Server series, is $2,799.
- **Sledgehammer3200FMF,** an array that combines two of the 1.6-Gbyte drives. The array comes with software that supports mirroring and spanning. An external version is $5,559; an internal version for the Quadra 950 is $5,399.

In addition, FWB reduced prices on several high-capacity drives and arrays, as well as its 3.5-inch magneto-optical and digital audio tape backup units. The cuts ranged from 15 percent to 24 percent. For instance, the Hammer2800FMF, a 2.8-Gbyte drive, now lists for $6,299, down 24 percent.

FWB Inc. is at 2040 Polk St., Suite 215, San Francisco, Calif. 94109. Phone (415) 474-8055; fax (415) 775-2125. □

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Mind Path takes remote control to new length

Unit controls cursor up to 60 feet away

By Nathalie Welch

Dallas — Freedom to roam takes on new dimensions with Mind Path Technologies Inc.'s new wireless remote control, which lets users take long-distance control of their cursor and keyboard.

The Mind Path IR90 Remote Control, due to ship in July for $395, has an infrared transmitter that sends signals from up to 60 feet away to a receiver attached to a Mac's Apple Desktop Bus in place of a mouse. The 8-ounce transmitter measures 2.5 by 2.5 by 1 inch.

Users control cursor direction by depressing the edges of a large circular MouseDisk button. To click, double-click, and click and drag, users press the button's center.

Eight buttons located near the top of the remote control provide access to image controls such as brightness, contrast and image position. For keyboard control, the remote device offers four predefined buttons and 10 that users can program.

The remote control is compatible with a variety of presentation systems, including ones from 3M, Proxima Corp., In Focus Systems, Sharp Electronics Corp. and nView Corp. Codes to control the selected presentation device are stored in the receiver and downloaded into the remote control by attaching the two devices.

The remote control comes bundled with the $99 Mind Path Presentation Tools software, which allows users to enhance computer presentations with special effects, such as on-screen drawing, zooming in, stamping clip art to any portion of the screen or throwing a circular spotlight onto any part of the screen. It also lets users continuously scroll a custom message across the screen and instantly clear the screen on command.

Mind Path Technologies Inc. is at 12700 Park Central Drive, Suite 1807, Dallas, Texas 75251. Phone (214) 233-9296; fax (214) 233-9308. □

Hawkeye zooms in on Mac screens with wireless infrared penlight pointer

By Nathalie Welch

Burlington, Vt. — Pointer Systems Inc. last month announced Hawkeye, an infrared pointer that lets users control a Macintosh by pointing at its screen from up to 12 feet away.

Due to ship to end users in October for less than $400, Hawkeye is available now to OEM customers. A developers kit is $1,995.

Hawkeye consists of a tiny infrared transceiver that attaches to the Apple Desktop Bus and a transmitter that acts as the remote control device.

Employing "penlight" infrared pointing technology that detects hand motion, Hawkeye operates in free space and positions the cursor wherever the user's hand is pointing. The device has a resolution of up to 12 bits (4,096 pixels), which eliminates jitters even on large monitors, according to the company.

Hawkeye can perform linear 2-D cursor control or angular 3-D cursor control, with three degrees of freedom: roll, pitch and yaw.

Hawkeye comes with control-panel software that lets users set cursor attributes such as speed and set up ways to simulate clicking and double-clicking by pointing at user-defined regions of the screen.

Hawkeye could also be used for hands-free industrial control of a Mac, according to the company. The remote unit could be mounted on a hard hat; users could then control the cursor by moving and "pointing" with their head.

Pointer Systems is also pitching the remote-control technology to manufacturers of home entertainment equipment to perform various on-screen programming functions, such as controlling a VCR.

Pointer Systems Inc. is at 1 Mill St., Burlington, Vt. 05401. Phone (802) 658-3260; fax (802) 658-3714. □



Pointer Systems' wireless remote control, Hawkeye, uses penlight infrared technology to give users long-distance control of their cursor.

PowerTrax 1.25 boosts security, interface options

By Ian G. Jacobs

Atlanta — Soft Solutions Inc. last week released an upgrade to PowerTrax, giving the contact-management application a face lift and several new security features.

With Version 1.25, users can mark information as personal, preventing others from accessing the data.

System administrators can limit the access of particular users to data files, preventing them from modifying specified documents.

The program now includes command-key equivalents for most operations.

Other interface enhancements include automatic capitalization of input fields, U.S. phone number formatting, support for custom screen sizes and more-flexible telephone dialing.

Users of the new version can choose to exchange only modified records with the server, to reduce network traffic or dial-up phone bills.

The program is based on Version 2.2.3 of ACI US Inc.'s 4th Dimension database. PowerTrax 2.0, a major upgrade due by fall, will be based on 4D 3.0.

PowerTrax 1.25 remains $495 for a single-user version; multiuser pricing varies by the number of users.

Soft Solutions Inc. is at 2900 Chamblee Tucker Road, Building 12, Suite 200, Atlanta, Ga. 30341. Phone (404) 457-9400; fax (404) 454-9800. □

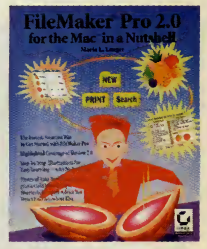


FROM THE
Bookshelf

A number of publishers offer books to help both users and developers master the latest version of Claris Corp.'s flat-file database.

FileMaker Pro 2.0 for the Mac in a Nutshell

By Maria L. Langer



This volume combines an introduction to database management with step-by-step instructions on how to use the program. It also highlights the new features of Version 2.0.

$15.95 / 350 pages / ISBN 0-7821-1214-5
Sybex Inc.
2021 Challenger Drive / Alameda, Calif. 94501
Phone (510) 523-8233
Fax (510) 523-2373

FileMaker Pro 2.0 for the Macintosh

By Rich Coulombre and Jonathan Price

This book-and-disk package helps readers design FileMaker Pro databases. It covers planning a database structure, importing and exporting, and searching and sorting. The disk includes sample databases and templates.

$34.95 / 464 pages / ISBN 0-201-62212-2
Addison-Wesley Publishing Co.
1 Jacob Way / Reading, Mass. 01867
Phone (617) 944-3700 or (800) 358-4566
Fax (800) 333-3328

Using FileMaker Pro 2 for the Mac

By Barrie Sosinsky

This tutorial and reference guide to the database package offers keyboard shortcuts as well as directions on how to design, create and manage databases. It covers both versions 1 and 2.

$27.95 / 600 pages / ISBN 1-56529-088-7
Que, a division of Prentice-Hall Computer Publishing
11711 N. College Ave. / Carmel, Ind. 46032
Phone (317) 573-2500 or
(800) 428-5331
Fax (317) 573-2583

The Macintosh Bible Guide to FileMaker Pro 2.0



By Charles Rubin

This guide includes a chapter on FileMaker Pro's calculation functions as well as many new tips to speed the program. A special section covers the use of scripting and buttons to automate data management.

$22 / 439 pages / ISBN 1-56609-029-6
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Performa 400	✦	✦	✦
Performa 600	✦	✦	✦
Mac II/Quadra	✦	✦	✦

ProColorServer display cards are available in 8-bit, 8•16-bit, and 8•16•24-bit versions, and support monitors from 13" to 21", with resolutions ranging from 640 x 480 to 1152 x 872. Lapis also offers a full line of DisplayServer™ and PowerBase™ monochrome display adapters for all Mac systems ranging from the Plus to the Quadra.

Trademark/Owner: Macintosh, Mac, Performa, Quadra/Apple Computer, Inc.; ProColorServer, DisplayServer, PowerBase, Lapis/Lapis Technologies, Inc.

Mac info published on the Internet

By David Morgenstern

Cupertino, Calif. — Acting to enhance its communications with silicon-tower academia, Apple last month named the first five on-line department chairs in the Apple Internet Higher Education Pilot Program.

The Apple-funded program gives Internet users access to current product and sales information previously available only through AppleLink or from campus-based Apple dealers.

The department chairs will publish articles electronically, covering the integration of Macintoshes in curriculum and research. They will also direct on-line user dialogue in their particular disciplines.

The five educational areas covered are business, computer science and engineering, library and information systems, mechanical engineering, and medical and health sciences.

Apple USA's Higher Education Division said it plans to add foreign language and education to the program's subject areas, with chair appointments in June.

The program was co-developed by the Computer and Information Services Department of the University of Minnesota in Minneapolis, which will administer it. The program uses the department's Gopher client-server technology.

In on-line discussions, some Internet users have expressed concerns that the Pilot forum is a "totally management-controlled environment," unlike the freewheeling Usenet News message groups on similar topics.

This was not a concern of Yves Starreveld, a medical student and Mac image-analysis programmer at Queen's University in Kingston, Ontario. He said he plans to use the resources offered by the project to help his search for information on computer-based charting applications.

Starreveld said he hopes the project "will provide a focused discourse and a chance to find out what people in other parts of the world are up to."

Other resources available on the Apple Computer Higher Education Gopher Server include: Intellimation, a Macintosh software catalog; Syllabus and Query, electronic versions of Apple's higher-education publications; Apple product news; press releases on Higher Education news and marketing programs; and service, support and training materials. The information is available via Gopher server at the Internet address info.hed.apple.com. □

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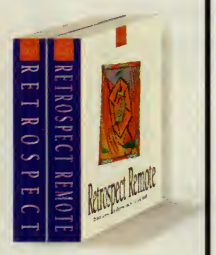
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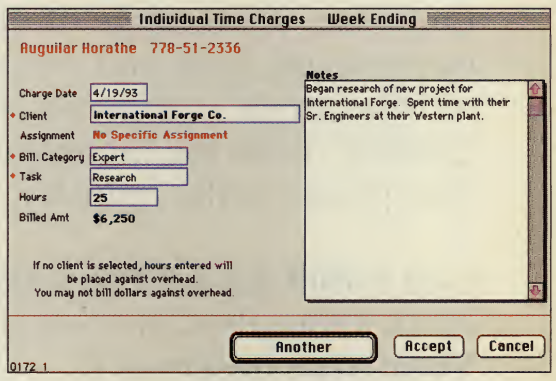
Lincoln ships Straight Shot billing package

By Ian G. Jacobs

Lincoln, Mass. — Lincoln Software Inc. this month shipped an accounting package for users who bill for professional services and allocate expenses to clients.

The $1,200 Straight Shot offers businesses such as architecture and law firms a hierarchical data system where users can double-click their way through six related levels of information.

Users can start at a deposit record and click through to the invoices contained in the deposit, then go deeper into the records.



The Straight Shot accounting package lets businesses bill time charges for each client record via the entry screen.

The package can generate and batch-print any combination of 23 reports.

In addition, Straight Shot offers traditional accounting functions such as general ledger, payroll and bank statement reconciliation.

A demonstration copy, which allows for the entry of only 200 records, for $25.

Lincoln also plans a client-server version that will support as many as 30 users. The server version is due June 1, but pricing has not been set.

Lincoln Software Inc. is at P.O. Box 639, Lincoln, Mass. 01773. Phone (617) 259-4315; fax (617) 259-8727. □

Micro Focus to bring compiler to A/UX

By Nathalie Welch

Palo Alto, Calif. — Micro Focus this month plans to ship a version of its Cobol compiler and tools for A/UX, Apple's Unix implementation.

The Micro Focus Cobol for Unix development environment includes tools that let developers create client-server or distributed processing applications and port existing programs to the A/UX environment.

VARs can port from host systems vertical business applications written in Cobol, such as customized accounting and insurance systems, then add support for platform-specific functions such as AppleTalk networks.

The complete development environment comprises a number of individually priced components. Micro Focus Cobol, priced at $1,250, includes an ANSI '85 certified compiler, Animator, Forms-2 and a native 68000 code generator. Micro Focus Toolbox for Unix, including an editor, forms builder and several interface-development and testing tools, sells for $625. The Micro Focus Dialog System for Unix, a graphical user interface builder, sells for $1,250.

The package is available on DOS, Microsoft Windows, OS/2, SCO Unix/386, AIX and more than 500 other Unix platforms, according to the company.

Apple plans to release A/UX 3.0.2, an updated version of its 6-year-old Unix for 680x0-based Macs, sometime later this quarter. The update will include support for the Quadra 800 and Centris 650 CPUs introduced this spring. The company said the new version will also enhance AppleTalk performance and add support for asynchronous I/O and multiple SCSI buses (see MacWEEK, April 19).

Micro Focus is at 2465 E. Bayshore Road, Palo Alto, Calif. 94303. Phone (415) 856-4161; fax (415) 855-9218. □



Jim Wetherbee inputs data from a medical experiment into a HyperCard stack on a PowerBook while pilot Mike Baker watches. A benchmark program run simultaneously on the shuttle and on the ground last October showed higher performance in the weightless environment.

EUROPEAN SPACE AGENCY

Portable carries its weight in space

By Philip Chien

Oberpfaffenhofen, Germany — Apple's own Edsel, the Macintosh Portable, currently is achieving cutting-edge prominence in an environment where its hefty weight won't be a drawback.

The Mac Portable is a key part of one of the 90 experiments aboard the Spacelab D-2 mission, launched with the space shuttle Columbia last week.

Sponsored by the European Space Agency, CTE (Crew Telesupport Experiment) consists of a Mac Portable with a graphics tablet and optical drive. The optical drive has a database with schematics, digitized photos and blueprints for the Spacelab module and its experiments. An identical Mac setup, connected via a modem/radio link, is located here at the payload control center.

CTE is designed to help astronauts, in cooperation with ground personnel, analyze unexpected problems with the complex experiments and sophisticated hardware aboard the Spacelab. Since this is a demo, the current database contains only limited information.

Astronaut Tom Hendricks said, "On space station where your flight data file may be reduced, [CTE can serve a useful purpose] by putting pictures or drawings on an optical disk and allowing an operator on the ground to communicate [in] real time with an operator on the space station for things like in-flight maintenance."

In other Mac space news, engineers at the Johnson Space Center in Houston have released the final report for the STS-52 mission that flew last October.

In one experiment, similar Macs aboard the shuttle and at mission control were monitored by MacEKG, a performance-analysis tool from MicroMat Computer Systems of Novato, Calif. Unexpectedly, the Mac in space operated better than the one on the ground. Investigators assume that the difference in performance was because the hard drive motor didn't have to work as hard to move the weightless servo mechanisms. □

Dictionary gives rhymes

Seattle — How often have you searched for a rhyme, only to find your choice to be a grammatical crime?

Eccentric Software is trying to end that problem with a rhyming dictionary for the Mac dubbed A Zillion Kajillion Rhymes.

The program, available now, includes a proprietary dictionary of common, technical, literary and slang words as well as thousands of proper and place names.

The company is offering the product at a special introductory price of $34.95 through May 31, after which it will be $49.95.

Eccentric Software is at P.O. Box 2777, Seattle, Wash. 98111-2777. Phone (206) 628-2687; fax (206) 628-2681. □

Cyborg adds back ends to HR management line

By Robert Hess

Chicago — Cyborg Systems Inc. this month began supporting relational database back ends for its line of multiplatform human-resource management software.

Cyborg's Solutions Series includes its Human Resource Management System, Payroll, Benefits, and Time and Attendance packages. Clients for the Solution Series are available on a variety of graphical user interface platforms including the Macintosh and Windows.

The host-based back end of the Solution Series is now available for DB2, Rdb and Oracle databases. Sybase, Informix and Ingres versions are due out this summer.

Cyborg said the Solution Series, which previously supported only hierarchical and flat-file databases, now provides full support for SQL and for the functionality of each vendor's relational database-management system.

Pricing for Cyborg's Solution Series ranges from $50,000 to $360,000, depending on the type of installation and number of users.

Cyborg Systems Inc. is at 2 N. Riverside Plaza, 12th Floor, Chicago, Ill. 60606. Phone (312) 454-1865; fax (312) 930-1033. □

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Management

Managers and employees benefit from Disabilities Act

The Americans with Disabilities Act requires that qualified employees be treated no differently than other workers.

By Reese Erlich

Mike Kucklinca faced a serious dilemma in August 1991. Kucklinca, vice president in charge of Citibank's computer systems for checking and savings accounts, was about to lose one of his better programmers because of a disability.

Programmer Marc Handler had developed stabbing pains that shot from his wrist into his upper arm, caused by years of pounding a keyboard 12 hours a day. He had a wrist operation, and doctors told him he could not use a keyboard for more than a half-hour a day.

Kucklinca, who works out of Citibank's Queens, N.Y., offices, faced a typical manager's problem. Would the company have to transfer Handler or install expensive new equipment to do the job? Would Handler be significantly less productive?

Kucklinca also faced a new set of questions because relevant portions of the Americans with Disabilities Act took effect in January 1992. The law requires that qualified, disabled employees be treated no differently than other workers. Companies must make "reasonable accommodations" for the disabled to do their job (see story below).

But Kucklinca didn't know how the law applied in this case. In the days before the ADA, Citibank could have transferred or possibly fired Handler. Now that could be illegal.

On the other hand, the ADA isn't the bogy that many Mac managers feared. In many cases, problems can be resolved through mutual discussion. Managers are also learning that the ADA gives them leverage with corporate financial folk to spend money for necessary equipment.

Kucklinca said the existence of the ADA definitely "expedited things" with higher management. "There was no gray area" about whether the company should accommodate Handler's disability.

High tech on the job. Handler was a Mac enthusiast long before his injury; he had bought Voice Navigator from Articulate Systems Inc. of Woburn, Mass., to use at home just for fun. The program accepts voice commands to operate his Mac SE/30, which reminded Handler of the futuristic computers on "Star Trek."

"I fell in love with it," he said.

After his injury, Handler was able to combine his "Star Trek" fantasies with Mac capabilities to keep him on the job. Handler had been working at a dumb terminal connected to an IBM Corp. MVS mainframe. Handler suggested that Citibank buy him a Mac IIci equipped with MacMainFrame from Alpharetta, Ga.-based Digital Communications Associates Inc. to simulate his mainframe terminal.

He then put together a system of peripherals and software that enabled him to do his job with minimum use of the keyboard:

- Co:Writer software from Don Johnston Developmental Equipment Inc. of Wauconda, Ill., combines with Voice Navigator to speed word recognition. Handler doesn't have to spell out each individual letter to form a word. Co:Writer recognizes certain words from just the first few letters and types the possibilities on the screen. "It's intelligent and learns new words," Handler said.
- ScreenKeys from Prentke Romich Co. of Wooster, Ohio, provides an on-screen keyboard. Instead of pounding the keyboard with the resultant pain, Handler directs the cursor at a letter, using a mouse or mouse substitute, and the letter appears on the screen.
- UnMouse from MicroTouch Systems Inc. of Wilmington, Mass., is a 3-by-5-inch glass-topped tablet that moves the cursor by touch, with virtually no pressure. It substitutes for the traditional mouse.
- Curtis MVP Mouse from Curtis Manufacturing Co. of Jaffrey, N.H., has a foot switch that allows Handler to move the cursor using a trackball with his hand but click with his foot, thus avoiding potentially painful stress on his wrist.

Handler uses these devices in various combinations to program Citibank's mainframes. "I'm not as fast as I used to be," Handler said. "But I increased my efficiency by using voice commands," while other programmers still have to use the keyboard.

Kucklinca said any loss of speed is more than made up by Handler's extensive knowledge of Citibank's complicated retail banking programs. "We as an organization are happy with the productivity we get out of Marc."

Keeping Handler as a happy, productive worker was well worth the expense, Kucklinca said. He made a reasonable request for equipment, and it "was within our budget."

Others not so sanguine. Mitch Zaretsky said many Mac managers are not so enlightened. He is president of Farmingdale, N.Y.-based Maxi-Aids Inc., which distributes computer peripherals and software for the disabled. He also acts as a disability consultant to Fortune 500 companies.

Zaretsky said that, in the minds of many managers, "conforming to ADA is about preventing lawsuits, not helping the disabled."

One bank that he declined to name has a blind employee who, according to Zaretsky, asked for improved equipment on his Mac. Although corporate managers expressed concerns about possible lawsuits, "Eight months later, the bank still hasn't bought the new equipment," Zaretsky said.

Tom Wlodkowski has firsthand experience with that mentality. Blind since birth, he worked for many years as a radio reporter in the New England area. He never told prospective employers of his disability until he arrived for the in-person interview.

See Disabilities Act, Page 22



MARIO RUIZ

Mike Kucklinca (left), Citibank vice president, helped Marc Handler set up his desk to accommodate a serious wrist injury. Handler is holding the foot pedal he uses.

What is the ADA?

The Americans with Disabilities Act provides basic civil-rights protection for the estimated 43 million Americans with disabilities. The ADA mandates that public accommodations are accessible and that phone companies provide needed services for disabled people, among other items.

Title I of the law requires that employers do not discriminate in the hiring or promotion of qualified disabled people. Employers cannot discriminate in hiring and must make "reasonable accommodations" for disabled workers to perform their job. A company need not make that accommodation if it creates "an undue hardship," however.

Maud Steyaert, an ADA expert with the Disability Rights Education and Defense Fund in Berkeley, Calif., said many managers are confused by the law. She discussed some of the most commonly asked questions.

- The employee, or prospective employee, must meet minimum qualifications for the job, she said. A blind person obviously cannot drive a delivery van. But, given modern technology, disabled people can work most office jobs, particularly with all the add-ons available for Macs.
- Managers must make reasonable accommodations to provide computer programs, peripherals or office equipment to allow the disabled person to work. It doesn't have to be the most expensive accommodation, she said.

"Let's say a person in a wheelchair needs a higher desk," Steyaert said. "The company could buy an expensive adjustable table or just stack phone books under the old one."

- An employee cannot demand accommodation if it creates an "undue hardship" on the company, which the Equal Employment Opportunity Commission has defined as "unduly costly or disruptive." Whether a particular change causes undue hardship will ultimately be tested in court cases.

Steyaert said managers and workers resolve most complaints amicably. For a Mac manager "it makes sense to keep people happy" by spending some money on needed accommodations, Steyaert said. The employees "will do a better job."

A disabled employee faced with discrimination has the right to file a complaint with the EEOC and later sue in federal court.

For accommodation advice, Disability and Business Technical Assistance Centers can be reached at (800) 949-4232. — By Reese Erlich

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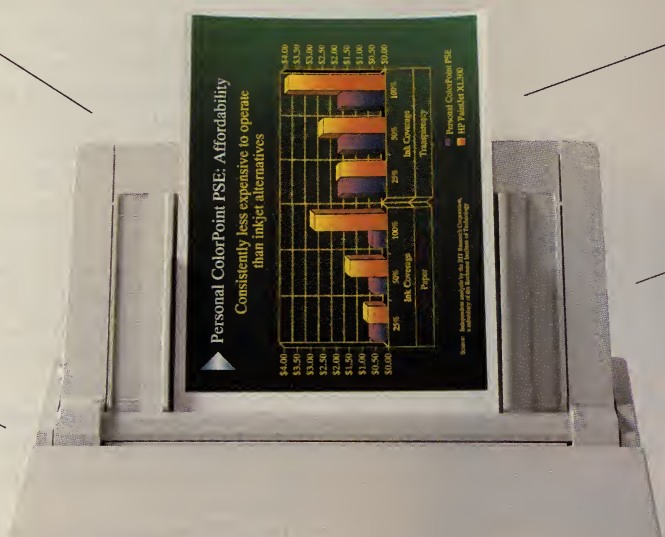
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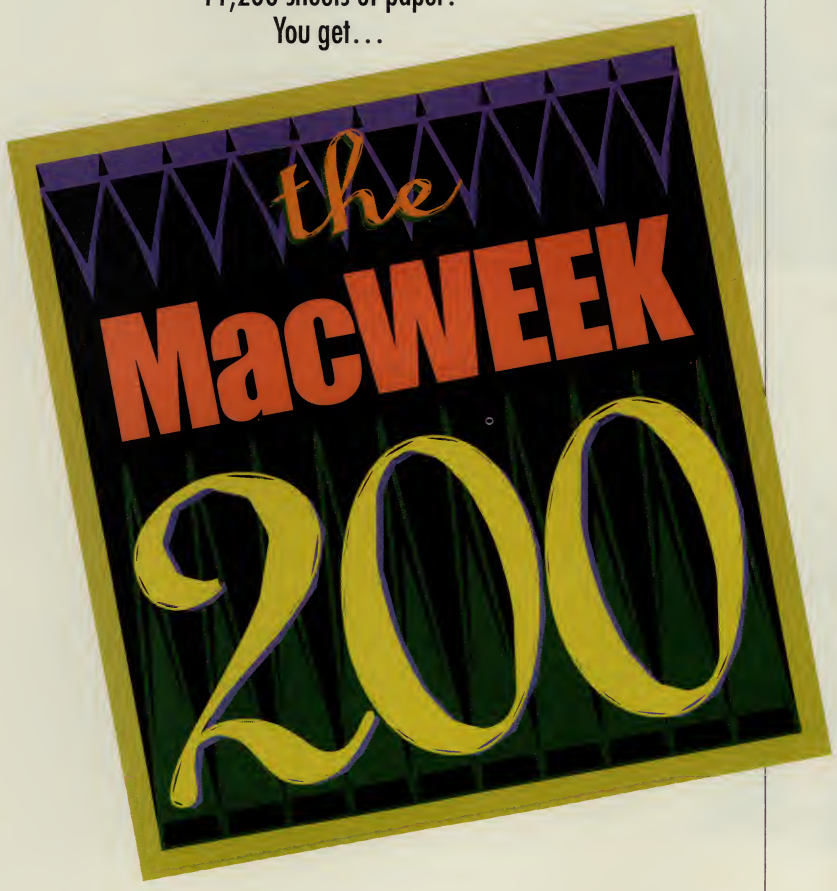
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Disabilities Act

From Page 20

"They were surprised to find out I was blind," Wlodkowski said. He said a number of employers turned him down strictly because of his disability.

Innovative Boston television. Wlodkowski now works at Boston public TV station WGBH. Unlike previous employers, he said, WGBH is already set up to accommodate disabled employees. That's made easier by the station's wall-to-wall use of Macs.

"WGBH is a complete Mac environment," Wlodkowski said. "If you don't have a Mac, you don't have a job here."

He works as the outreach assistant for WGBH's innovative Descriptive Video Service. This service allows blind listeners to hear descriptions of scenes in movies or videos between pauses in the dialogue. That dialogue was created through the use of a proprietary Macintosh editing program developed by WGBH that allows someone to insert voice into existing films.

At his workstation, Wlodkowski uses outSpoken from Berkeley Systems of Berkeley, Calif., a program that verbalizes anything that appears on the screen in type. He also uses the Duxbury Translator from Duxbury Systems Inc. of Littleton, Mass., which translates text files into Braille. WGBH also bought him a Braille printer.

Wlodkowski said that his supervisors at WGBH are firmly committed to disability rights, but managers at other companies may be more hesitant.

The ADA has opened new areas of potential conflict, Wlodkowski said, so the "best thing a company can do is ask the disabled employee. The employee must know what he needs. And the employer has to be open enough to judge a candidate on the merits of the job."

ADA can help the whole office. Morgan Watkins, manager of microcomputer technologies at the University of Texas in Austin, which ranked as the No. 1 education site in the 1992 MacWEEK 200 survey, agreed that managers are still getting used to the ADA. Watkins, who is sight-impaired, is on a campus committee dealing with disabled issues.

Watkins said administrators at the school are relatively enlightened, but "there are companies out there who are going to wait for court cases" before they agree to ADA practices. "They just don't want to change."

But Watkins said the UT experience shows that changes can be made economically and to the mutual benefit of everyone in the office. He cited two examples.

First, UT makes course catalogs, library records, administrative memos and other written material available through electronic databases. This helps disabled people get material immediately printed in large type or Braille or converted into audio formats. But such databases clearly help all students and faculty do faster research and keep up to date.

Second, even things as simple as curb cuts and grab bars in bathrooms, originally mandated to help the disabled, have proved useful for bike riders, skateboarders and senior citizens.

If managers abide by the spirit of the ADA, Watkins said, they will provide needed jobs for the disabled and improve office morale.

Employing the disabled, women and different ethnicities "adds some sparkle to the workplace," Watkins said. "Everyone learns from a diversity of views and peoples." □

Calendar of Events

MAY

9-12: SUGI 18 Conference, New York. Statistical-analysis conference with special problem-solving booths to cover specific software snags. Contact SAS Institute Inc. at (919) 677-8000; fax (919) 677-8166.

9-13: Apple Worldwide Developers Conference, San Jose, Calif. Presentations on Mac and other Apple technologies and marketing techniques. Contact CMI at (415) 705-8050; fax (415) 291-0126.

11-13: Blyth Software User's Conference, San Jose, Calif. Conference for users developing with Blyth's Omnis 7 database. Contact User Group Services at (508) 470-3933 or (800) 767-2336; fax (508) 470-0526.

11-13: Computer Storage Exposition and Conference, Anaheim, Calif. Storage security and PCMCIA will be discussed and new technologies displayed. Contact Eberhard & Co. at (212) 486-6186; fax (212) 486-6481.

13-15: Macworld Milan, Milan, Italy. European expo and conference featuring all categories of software and hardware. Contact IDG at (508) 879-6700 or (800) 225-4698; fax (508) 872-8237.

13-16: Prepare for Growth, Tarrytown, N.Y. Annual forum of the Independent Computer Consultants Association. Contact ICCA at (800) 438-4222; fax (314) 567-5133.

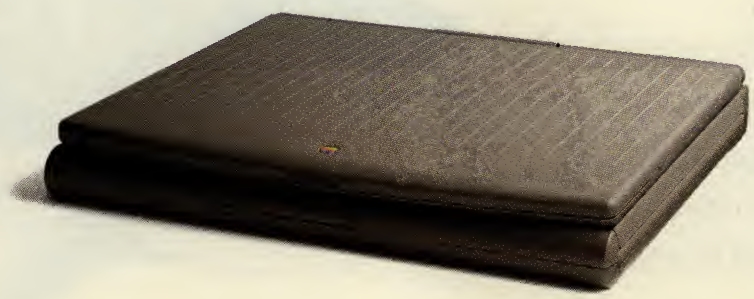
16-20: Comnet '93, Dallas. Conference and expo on voice, data and telecommunications. Includes demonstrations of wireless technology. Contact World Expo Corp. at (508) 545-3976; fax (508) 872-8237.

19-21: Virtual Reality 93, San Jose, Calif. Conference covers military applications, investment opportunities, and uses of virtual reality in the fields of advertising and medicine. Contact Meckler Conference Management at (203) 226-6967 or (800) 635-5537; fax (203) 454-5840 or (800) 858-3144.

25-27: NeXTWorld Expo, San Francisco. Developer and user conference for the NeXTstep operating system with a product showcase. Contact User Group Services at (508) 470-3880 or (800) 767-2336; fax (508) 470-0526.

Please submit notices of conferences, trade shows and other Mac-related events to Calendar, MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105, or fax to (415) 243-3650. No training or educational seminars please.

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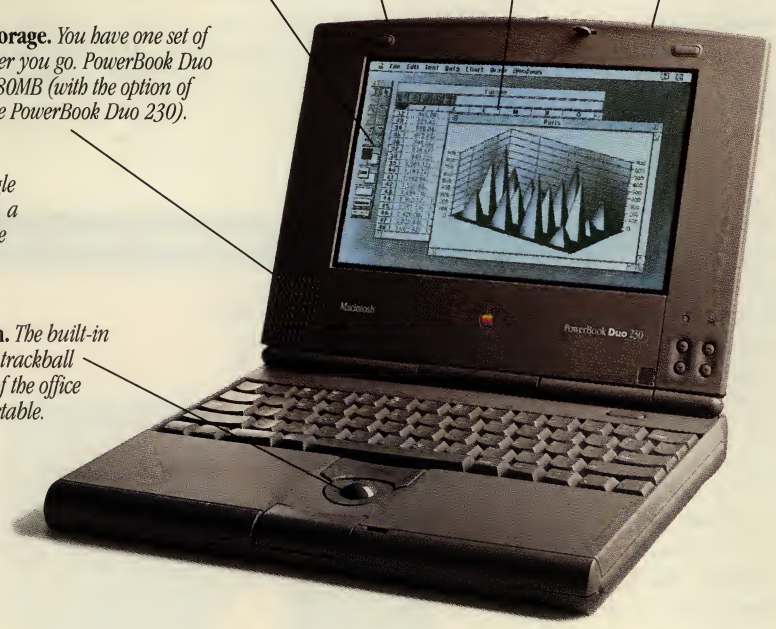
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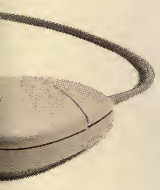
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Workgroup Server 95 ready to roll

A/UX and PDS card speed AppleShare Pro

By April Streeter

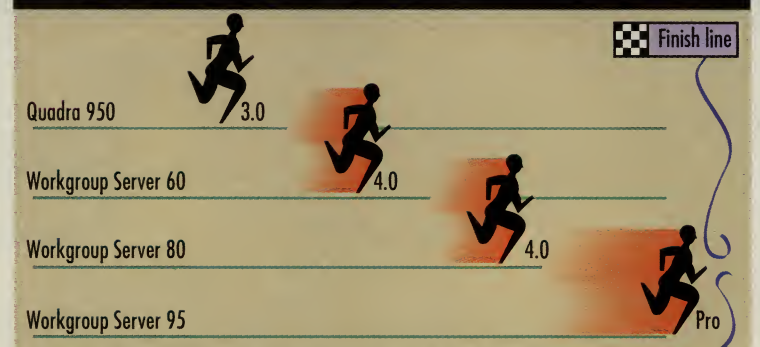
Cupertino, Calif. — With this week's shipment of its Apple Workgroup Server 95, Apple is firmly setting its sights on the fast-growing client-server market.

While Macs of every stripe have served over the years as file and print servers, the AWS 95 is the first Apple hardware designed specifically for server use. The product consists of a Quadra 950 fitted with a new processor direct slot card that speeds I/O; A/UX 3.0.1, a version of Apple's Unix implementation specially tuned for the server; and AppleShare Pro, a new A/UX version of the company's file- and print-server software. Some configurations also include a Hewlett-Packard digital audio tape drive with built-in compression.

Prices, depending on configuration, range from $7,589 to $12,839, including a bundled copy of a new A/UX version of Retrospect Remote 2.0, Dantz Development Corp.'s network backup software.

Sites that already have a Quadra 900 or 950 available can upgrade by purchasing AppleShare Pro for $2,399, plus a $2,499 upgrade kit that includes the PDS card and A/UX 3.0.1 or a $4,399 kit that also includes the DAT drive and Retrospect.

AppleShare Pro hits the tape first



Apple performance benchmarks rate AppleShare Pro four times faster than 3.0 running on a Quadra 950. AppleShare 4.0 was two to three times faster than the Quadra running 3.0, depending on whether it ran on the AWS 60 or AWS 80.

NEVIN BERGER

For large workgroups, AppleShare Pro promises to top the performance of the current release of AppleShare, Version 3.0.1, and 4.0, a new version due in June for 68040-based Macs (see chart). The AWS 95 and AppleShare Pro support as many as 50 simultaneously active users and 200 logged-on users and up to 5,000 open files; as many as 28 hard disks can be connected simultaneously, Apple said.

"I feel the 95 has the best thing going as far as the combination of business applications and price-performance," said beta-tester Richard Pubash of Prudential Bank & Trust Inc. of Atlanta. "Also, from a network manager's perspective, it's easier to integrate [than Novell Inc.'s NetWare]. I'd eventually like servers that users can maintain, and AppleShare makes that a lot easier."

New features of AppleShare Pro include:

- **Asynchronous input-output.** Because it is built on A/UX's multitasking, multithreaded operating system, AppleShare Pro lets the processor handle other tasks while it is accessing the disk to allow file reads and writes to overlap.
- **File system caching.** According to AppleShare Product Manager Gary Schare, Pro will hold a file for instant recall until another file comes into the cache and pushes the original file out. The PDS card has 128 Kbytes of second-level static RAM cache, expandable to 512 Kbytes.

The new software can read data in larger chunks than the Mac's normal 4 Kbytes, storing it in buffers. This means a 16-Kbyte file could be read in a single pass rather than the four passes AppleShare 3.0 requires, he said. □

AppleShare 4.0 will watch for piracy

Apple is about to serve up a new method to combat software piracy.

AppleShare 4.0, due in June, will include a new protocol called License Manager that searches AppleTalk networks for unauthorized copies of the server software. When an illegal copy is found, the protocol sends out a stream of messages to annoy administrators and users until an authorized version is installed.

The anti-piracy protocol will be invoked when AppleShare 4.0 is installed on any server on an AppleTalk network. Apple eventually plans to include License Manager in AppleShare Pro. In addition, at next month's Apple Worldwide Developers Conference, the company will announce a tool kit that lets third-party vendors use the protocol in their server products.

A broadcast protocol, License Manager crosses AppleTalk zones to survey the entire network and looks for other copies of AppleShare with the same serial number. According to Gary Schare, AppleShare product manager, surveying a network with 200 zones would take about four hours.

If the protocol finds an unauthorized duplicate, it sends an alert to the AppleShare administrator. If the administrator does not respond within an hour, License Manager sends notifications to users as they log onto the server, asking them to contact their administrator.

Eventually, if the unauthorized copy continues to run, the protocol begins to broadcast messages to all logged-on users. Restarting the server will reset the process.

"The messages are supposed to be an annoyance, but it will never shut down the server," Schare said. "It's designed to keep people from pirating and also just keep them legal."

Schare added that Apple wants to extend the protocol to client-based software programs but must first find a way to keep it from choking network performance. — *By April Streeter*

News Analysis

Early users give AURP thumbs up but need to adjust to new protocol

By Leonard A. Hindus

The idea behind AppleTalk Update-based Routing Protocol was simple: to replace the outdated and chatty Routing Table Maintenance Protocol with a more efficient method of synchronization to make it practical to tunnel AppleTalk through wide-area networks such as the Internet.

But by the time Apple finished with the protocol, it had bundled in Internet Protocol-specific tunneling, network management and security functions in an attempt to fortify AppleTalk for long-distance duty.

Early users are generally bullish about the resulting AppleTalk Update-based Routing Protocol (AURP), although they have had to adjust their network-management procedures to account for the new protocol's capabilities.

Chatterbox. Intended to be a simple and friendly protocol for making sure all the routers on an AppleTalk network automatically know about each other, the Routing Table Maintenance Protocol (RTMP) requires every router to

See AURP, Page 32

EO beats Newton out the door, comes up short on Mac links

By April Streeter

Mountain View, Calif. — EO Inc. last month beat Apple to the punch at getting a personal digital assistant to market, but Macintosh users must concoct their own methods to communicate with the new devices.

The $1,995 EO 440 runs at 20 MHz and is powered by AT&T Co.'s Hobbit RISC chip and GO Corp.'s PenPoint operating system. It ships with 4 Mbytes of RAM and has an internal 9,600-bps modem.

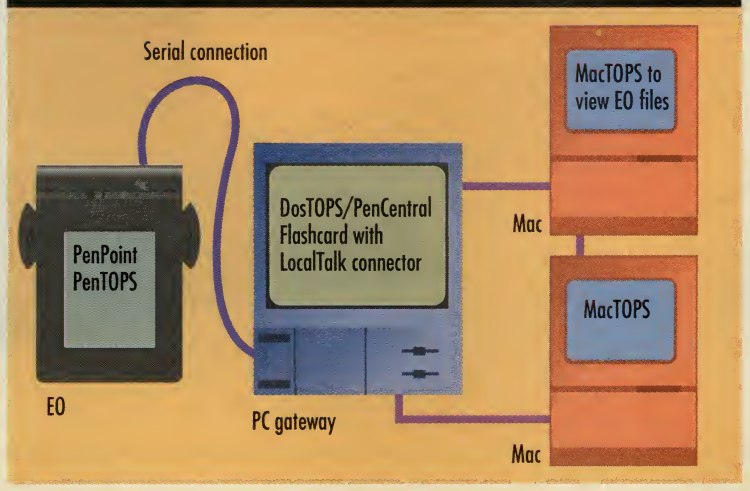
For network connections, EO 440 is bundled with PenTOPS client software from SunSelect of Alameda, Calif. File transfers between the EO and IBM PC or compatible computers are accomplished via SunSelect's $149 PenCentral software.

The lack of direct EO-to-Mac file transfers led project engineer James Rycek of Lawrence Livermore (Calif.) National Laboratory to find his own Mac connectivity solution. He turned a PC with PenCentral, DosTOPS and SunSelect's Flashcard LocalTalk adapter into a gateway on his AppleTalk network.

"MacTOPS and DosTOPS have always interoperated; there's nothing new about that," Rycek said. "MacTOPS and PenTOPS also work together, so the solution was to plug in my old PC, which other-

See EO, Page 28

TOPS links EO and Macs at Livermore Lab



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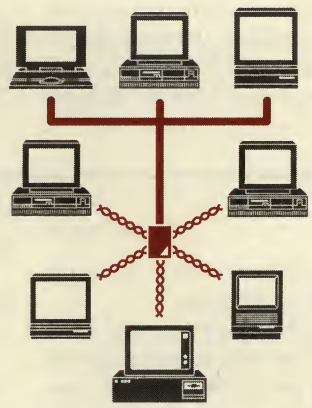
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Caravelle NetWorks expands view to SNMP

Update also monitors IPX and DECnet

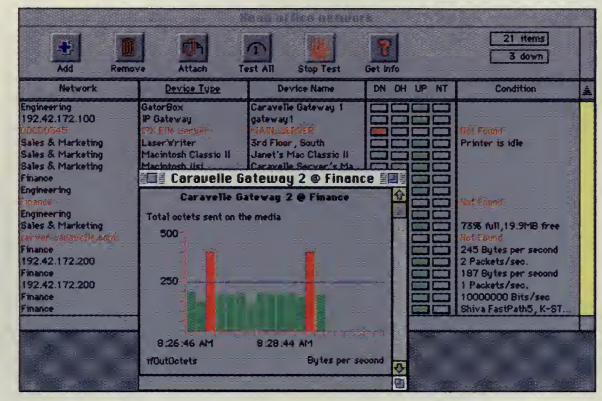
By Leonard Heymann

Nepean, Ontario — Caravelle Networks Corp. last week shipped the latest version of its network-management application, adding support for SNMP devices on AppleTalk and TCP/IP networks.

The $995 NetWorks 3.0 monitors network devices and services and sends alerts in the event of problems (see MacWEEK, Dec. 14, 1992). In addition to SNMP (Simple Network Management Protocol), Version 3.0 supports Novell Inc.'s IPX (Internetwork Packet Exchange) and Digital Equipment Corp.'s DECnet.

For SNMP management, NetWorks 3.0 offers default MIBs (Management Information Bases) and a built-in editor to create custom MIBs.

Other new features include test calendars that let users set testing times and intervals; the ability to monitor zones; and support for SMTP (Simple Mail Transfer Protocol) to let users receive alerts using Unix-based mail packages.



NetWorks 3.0, which adds support for SNMP, IPX and DECnet protocols, can graphically display network traffic data for individual devices and color-code values that exceed thresholds.

"NetWorks has changed the way we look at the network," said Roy Roper, a network manager at the School of Life Sciences at the University of Illinois at Urbana-Champaign. "By using the correct SNMP MIB, NetWorks 3.0 monitors a number of network issues using our routers in our other buildings." For instance, Roper said, even some uninterruptible power supplies can now be managed through SNMP.

Eric Epstein, corporate network manager for Framingham, Mass.-based speaker maker Bose Corp., said that with the addition of SNMP, NetWorks 3.0 compares favorably with Cabletron Systems Inc.'s Spectrum Advanced Management System, which starts at $18,000. "It's the easiest SNMP management I have ever set up," he said.

Users can upgrade to NetWorks 3.0, which monitors an unlimited number of devices, for $149 until June 1 and $199 thereafter. A Jr. version, which supports up to 20 devices, is $295; upgrades are $99 until June 1 and then go up to $129.

Caravelle Networks Corp. is at 301 Moodie Drive, Suite 306, Nepean, Ontario K2H 9C4, Canada. Phone (613) 596-2802; fax (613) 596-9659. □

Server Manager joins GraceLAN line

Austin, Texas — Technology Works Inc. last week expanded its line of network-management tools with a deal giving it exclusive rights to market Santorini Consulting & Design Inc.'s Server Manager.

Under the agreement, Technology Works last week shipped what it now calls GraceLAN Server Manager. The software, which made its debut early this year, offers remote-management capabilities for AppleShare 3 servers (see MacWEEK, Feb. 1).

The repackaged Server Manager is the first result of a partnership the two companies formed to develop and market network-management and portable computing software.

GraceLAN Server Manager is priced at $395, a five-server pack is $695, and a 10-server pack is $995.

A revision of the program, due next month, is expected to simplify the management of users and groups, among other enhancements.

Technology Works Inc. is at 4030 Braker Lane W., Suite 350, Austin, Texas 78759. Phone (512) 794-8533 or (800) 688-7466; fax (512) 794-8520. □

AXiON adds auto-switching

By Nathalie Welch

Sunnyvale, Calif. — AXiON last month shipped an upgrade to its serial-port switch that gives users additional ways to choose between connected serial devices.

The AXiON Intelligent Electronic Serial Port Switch 2.2, priced at $159, is a three-port external device that plugs into the Mac's serial port. By attaching two AXiON switches to a Mac's serial ports, a user can attach up to six devices.

The new version also adds auto-switching between connected serial devices for applications that use the Macintosh Communications Toolbox. When a user launches a Comm Toolbox application that has been previously configured to a specific AXiON port, the appropriate device is automatically selected.

A pull-down menu has also been added to give System 7 users easy access to connected serial devices. The upgrade, which is free to previous users, also still offers device selection via the AXiON control panel.

AXiON is at 1150 Kifer Road, Suite 203, Sunnyvale, Calif. 94086. Phone (408) 522-1900; fax (408) 522-1908. □

EO

From Page 26

wise would have ended up in the slush pile, as a gateway."

Rycek is working on a hazardous-waste safety-inspection project and wants to use the EO as a data input device. He can see a list of EO files from his Mac and transfer them to his hard drive simply by dragging.

Rycek said he had an uphill climb with management to gain support for the new technology until he demonstrated how EOs improve hazardous-waste safety inspections because data could be directly transferred to Macs and from there to departmental VAXes.

"When [inspectors] find a deficiency, they put it on paper then transfer it to a computer work order. With that system, it can take a month to get an asphalt crack fixed," he said.

Rycek said he wants to test Apple's Newton and other PDAs to see how they compare with the EO.

"My hope is that [SunSelect and third parties] are going to make it easier to put it all together," Rycek said. "Most employees couldn't set up anything like this on their own."

According to SunSelect, a Macintosh version of PenCentral, which would offer transfers via parallel, serial or modem connections, is in the works. A delivery date and price have not been set, a company spokesman said.

EO Inc. is at 800A E. Middlefield Road, Mountain View, Calif. 94043. Phone (415) 903-8100 or (800) 458-0880; fax (415) 903-8190. □



Gateways BRIEFS

DCA cards shed light on network with TokenPeek

Alpharetta, Ga. — Digital Communications Associates Inc. says its token-ring cards won't get in the way of low-level network management.

The Mac-to-mainframe connectivity company said its line of token-ring cards can now be used with The AG Group Inc.'s TokenPeek, a Mac-based packet analyzer for token-ring networks.

DCA's $895 LanWay and $795 MacIrmatrac, recently acquired from Avatar Inc., passed compatibility tests last month and fully support the $995 TokenPeek.

Using TokenPeek, network administrators can analyze network patterns and statistics and TokenTalk packet contents of traffic captured on the local ring.

Digital Communications Associates Inc. is at 1000 Alderman Drive, Alpharetta, Ga. 30202. Phone (404) 442-4000; fax (404) 442-4368.

FirstClass opens BBS to Windows users

Scarborough, Ontario — Windows users can now join discussions and send electronic mail on SoftArc Inc.'s Macintosh-based FirstClass bulletin board system.

The FirstClass Client for Windows, shipping this week, will be free and available on a variety of on-line services. Upgrading a FirstClass server to accept Windows clients will cost $295. An IPX (Internetwork Packet Exchange) protocol option, needed to accommodate NetWare client log-ons in addition to AppleTalk users, will be $495.

Sending files between Mac users and IBM PC and compatible users will require cross-platform applications.

SoftArc Inc. is at 805 Middlefield Road, Suite 102, Scarborough, Ontario M1V 2T9, Canada. Phone (416) 299-4723; fax (416) 609-2250.

RCOM offers new emulation options

Kailua-Kona, Hawaii — Computer Vectors Inc. has added new Mac-to-IBM PC and compatible and Mac-to-mainframe connectivity options to its terminal-emulation package.

RCOM-Mac 3.1, available for $179.95, now has both Zmodem and Ymodem protocols in its list of available emulations, as well as automatic FTP (File Transfer Protocol) for unattended file transfers.

Computer Vectors said its package, which now includes American National Standards Institute color support, is the only emulation package to fully support the file transfer software, based on the IND$FILE protocol, that is included with IBM mainframe computers.

Owners of previous versions can upgrade for $50.

Computer Vectors Inc. is at 74-5599 Luhia St., Suite E7, Kailua-Kona, Hawaii 96740. Phone (808) 329-6645; fax (808) 329-6523.

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Dayna adding SNMP support to line of Ethernet adapter cards

By April Streeter

Salt Lake City — Dayna Communications Inc. this week is adding SNMP support to its line of network interface cards, and it will unveil an installer program that lets managers load drivers onto a network's Macs from a single computer.

NetInstaller, co-developed with Trik Inc. of Austin, Texas, will be available next month without charge to all users of Dayna's DaynaPORT Ethernet adapters. The installer lets an administrator load driver updates onto a single Mac and distribute them to applicable Macs on the network.

Dayna's new SNMP (Simple Network Management Protocol)-compatible cards include the DaynaPORT E/LC-M, a $269 10BASE T and thin-net card for the Mac LC; the DaynaPORT E/SE-3, a $269 three-in-one media card for the Mac SE; and a new series of cards to fit either the Mac IIsi or SE/30 called the DaynaPORT E/si30. A two-media version of the E/si30, with thin and 10BASE T or thin and thick connectors, is $239. A version with all three media is $269.

The cards support Apple's implementation of SNMP via a driver that allows an SNMP management program to collect packet information such as number of error packets generated or total number of bytes sent.

Dayna is at Sorenson Research Park, 849 W. Levoy Drive, Salt Lake City, Utah 84123. Phone (801) 269-7200; fax (801) 269-7363. □

Macs, PCs talk with ASP drivers

Sunnyvale, Calif. — ASP Computer Products Inc. last month shipped two printer drivers that let Macs join IBM PCs and compatibles in sharing non-networked printers.

The MacJet driver lets Macs print to a non-PostScript printer equipped with an ASP printer-server device. The OnPage driver works in the same way for PostScript printers. Both drivers are $149. Users can copy the drivers to multiple Macs. A Mac cabling kit is required; prices start at $27.50.

ASP's printer-server products let up to 16 users share a non-networked printer. The line includes both external boxes and internal cards for Hewlett-Packard, Brother and Canon printers. Prices range from $345 to $1,375.

ASP is at 160 San Gabriel Drive, Sunnyvale, Calif. 94086. Phone (408) 746-2965; fax (408) 746-2803. □

America Online answers Prodigy's call

Both services offer flexible pricing plans

By Nathalie Welch

Vienna, Va. — Mathematicians might be needed to figure out who has the best deal now that America Online Inc. has restructured its prices in response to rate changes instituted last month by competitor Prodigy Services Co.

▸ **Prodigy.** Citing a prohibitive increase in the number of users accessing its Plus services, Prodigy will offer two separate pricing plans starting in July. Plus services are bulletin boards, stock quotes, an airline reservation system and news from Dow Jones & Co. Inc.

One plan has Prodigy users paying a flat fee of $14.95 per month for Core services only, including on-line shopping and games, and two hours of free access to Plus services a month, after which they pay connect-time rates that start at $4.80 per hour and decrease to $3.60 per hour.

Users can also send 30 free electronic-mail messages per month, after which they pay 25 cents each.

The second plan offers a flat-fee of $7.95 for two hours of access time to both Plus and Core services, with additional time also billed starting at $4.80 per hour and decreasing to $3.60 per hour. Users pay 25 cents for each E-mail sent. In addition, Prodigy eliminated a $2 surcharge to access its service at 9,600 bps.

▸ **America Online.** America Online this month began offering a flat fee of $9.95 for five hours of on-line time per month, with additional time billed at $6 per hour. Starting July 1, however, connect-time rates will be reduced to $3.50 per hour for additional time. E-mail usage is unlimited.

America Online Inc. is at 8619 Westwood Center Drive, Vienna, Va. 22182-2285. Phone (703) 448-8700; fax (703) 883-1509.

Prodigy Services Co. is at 445 Hamilton Ave., White Plains, N.Y. 10601. Phone (914) 993-8000; fax (914) 684-0278. □

On-line price changes as of July 1

	AMERICA ONLINE	PRODIGY
Monthly fee	$9.95	$14.95 (Core services)
Free hours per month	5	2 (Plus services)
Additional per hour	$3.50	$3.60 to $4.80 (Plus)

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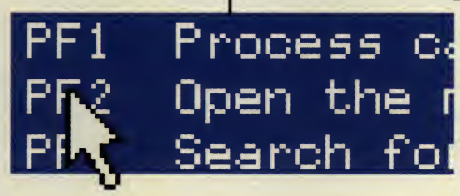
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AURP

From Page 26

spontaneously broadcast its entire table of known routers every 10 seconds. AppleTalk Phase 2 introduced the "split horizon" option, where a router can report only on the networks and devices on one of its ports, in an attempt to control runaway RTMP traffic. Even with split horizon, however, the overall network overhead imposed by RTMP increases geometrically with network size.

In contrast, under AURP, AppleTalk routers establish connections between each other and then broadcast only when information about devices changes. "AURP is a no-news-is-good-news approach to routing-table maintenance," said Garry Hornbuckle, AppleTalk evangelist. In the absence of a change, routers maintain congruent routing tables without the constant router-to-router traffic of RTMP.

AURP, which Hornbuckle said is just as reliable as RTMP, imposes no significant network overhead, no matter how large the network grows.

The relative benefit of AURP compared with RTMP depends on the number of routers on the AppleTalk network and the frequency with which they are added to or taken off the network.

Beta users reported that the Apple Internet Router 3.0 is extremely reliable.

Unclogging the tunnel.
AURP also makes it more practical to tunnel AppleTalk through other protocols, such as IP.

Tunneling refers to encapsulating AppleTalk packets within the packets of another transport protocol. For example, when two Apple Internet Routers communicate over the Internet, the sending router takes AppleTalk packets and sends them as data within an IP packet. IP then routes the packet over the Internet to the receiving Apple Internet Router, which strips the IP headers and routes the exposed AppleTalk packet. The process is totally invisible to the Mac user.

Because one of the major goals of AURP was to facilitate the tunneling of AppleTalk over the Internet, Apple decided to include its own IP encapsulation technique, network number remapping and enhanced security in the AURP specification.

Beta users report that the Apple Internet Router 3.0, the first product to implement the AURP specification, is extremely reliable. "The Internet Router functioned flawlessly and worked the way they said it would," said Doug Walsten, team leader for Macintosh Environments at the National Center for Supercomputing Applications at the University of Illinois in Urbana-Champaign, a beta-test site for the device. "AURP lets us connect with users at other National Science Foundation centers on a Mac-to-Mac level."

He added that the Apple Internet Router integrates easily into his existing AppleTalk network. The AURP specification includes an RTMP-to-AURP converter, and a router running AURP uses RTMP to communicate with LAN routers and AURP to communicate with WAN-based ones.

"The Internet Router has been rock solid," said Michael Robertson, a consultant with the San Diego Supercomputer Center, another beta-test site. "AURP does an excellent job of connecting AppleTalk LANs over the Internet. The problem is what it doesn't do. AURP is a WAN extension to AppleTalk. What we need now is [native] Wide-Area Network AppleTalk."

Walsten warned that network managers have to prepare for AURP and for connecting over the Internet. For example, AURP has a remote network-remapping feature that automatically resolves AppleTalk network numbering conflicts. If each organization numbers its AppleTalk network segments independently, there is a chance for conflict when two or more of them link LANs.

The network administrator can specify a range of numbers to set aside for use by remote networks. AURP maps the network numbers of incoming packets into that range. It then remaps outgoing packets back to the actual network numbers on the remote AppleTalk network. The various AURP routers keep track of each other by assigning themselves Domain Identifier numbers. These identifiers plus the network numbers provide a workable numbering scheme for remote, uncoordinated networks.

Robertson said that in some ways the AURP specification is not very AppleTalk-savvy. For example, AURP provides security by letting the administrator hide selected AppleTalk networks and devices from remote routers. The problem is that the logical unit of an AppleTalk network is the zone, and zones can span several networks. "I need to be able to hide zones," he said.

Zone-name conflicts.
AppleTalk assumes all Macs are created equal and, therefore, every user should see every device in every zone on the entire AppleTalk network. As a result, zone-naming conventions and Chooser management become important issues as a network grows.

Currently, there are no widely accepted zone-naming conventions in AppleTalk. When two or more sites connect over the Internet, they form one continuous AppleTalk network, and the zones may be indistinguishable when they all show up in alphabetical order in everyone's Chooser list.

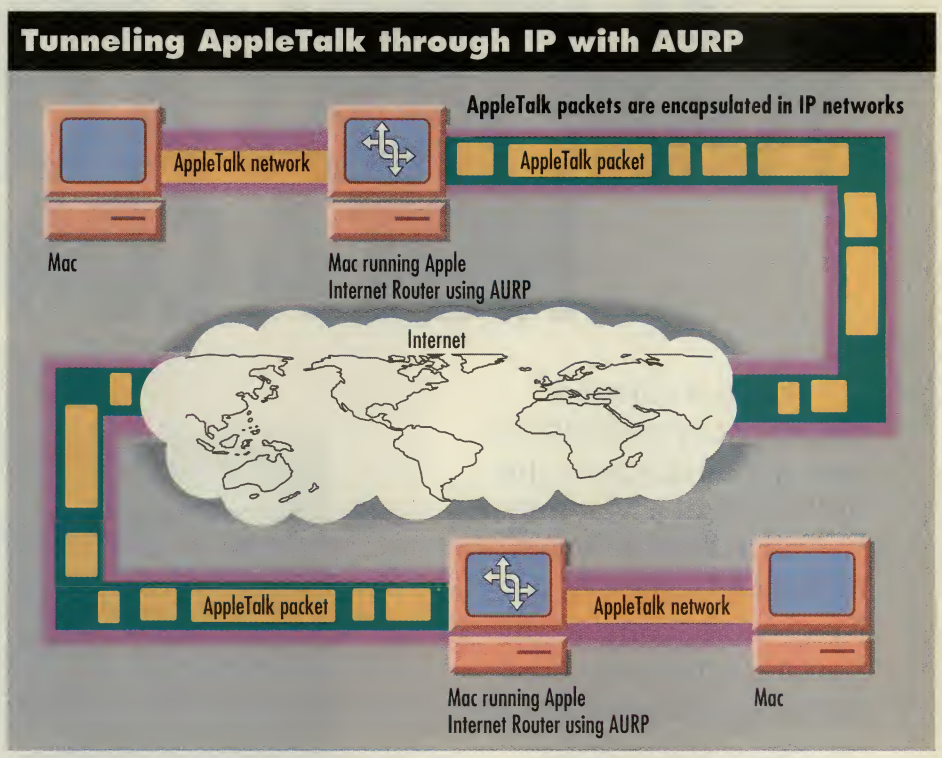
The two supercomputer centers solved the problem by renaming all their zones with four-letter site prefixes. For example, all the zones at the National Center for Supercomputing Applications now start with "NCSA." Now when the two sites connect over the Internet, all the zones are logically grouped within the alphabetical Chooser.

This solution, however, doesn't go far enough, Robertson said, because he needs to reduce complexity for users, not just give them more network access.

"Site-specific zone prefixes are a work-around, not a real solution," Robertson said. "The only practical solution is a hierarchical Chooser."

In a hierarchical Chooser, remote zones would be organized by the name of the remote router. "Suppose you have a small network with only a few zones and an Internet Router," Robertson said. "Then several large sites with many zones connect with you over the Internet. Your users would see this large and confusing Chooser with these zones most of them will never want to use."

While AURP creates some new management headaches, network administrators seem to view these problems as a small price to pay for the protocol's capability to speed AppleTalk through WANs. □



AURP reduces network chatter

NUMBER OF NETWORKS	RTMP BYTES/SEC.	% OF 56KBs	AURP T1	% OF BYTES/SEC.	% OF 56KBs	% OF T1
10	207	3.0%	0.1%	31	0.4%	0%
100	450	6.4%	0.2%	31	0.4%	0%
1,000	2,880	41%	1.5%	31	0.4%	0%

This chart shows the percentage of traffic attributed to router updates in a network that uses IP tunneling between 10 sites. The model is based on one router update per site per hour.

Source: Apple.

An emerging standard

There is little doubt that AppleTalk Update-based Routing Protocol is the beginning not only to connecting AppleTalk networks over the Internet but also to a new approach to AppleTalk development.

Apple and a number of vendors, including Cayman Systems Inc., Shiva Corp., Farallon Computing Inc., Cisco Systems Inc., Novell Inc., Wellfleet Communications Inc. and 3Com Corp. early this year formed the AppleTalk Network Forum to coordinate AppleTalk enhancements.

Apple has agreed to submit AppleTalk Update-based Routing Protocol (AURP) to the ANF for review and possible modification. A number of vendors are cautiously endorsing AURP while waiting for the ANF to iron out an industry standard. "Although Cisco has announced that we will support AURP, we are looking to the ANF to resolve some of the outstanding issues," said Glenn Wenig, AppleTalk product manager for Cisco Systems of Menlo Park, Calif.

Alameda, Calif.-based Farallon later this year plans to offer an AURP upgrade for its routers, said Larry Jones, product manager for network products. "We're using an Apple Internet Router as a development system," he said. "We have AURP implemented on our StarRouters and InterRoute/5 routers, and we expect to be shipping soon." — By Leonard A. Hindus

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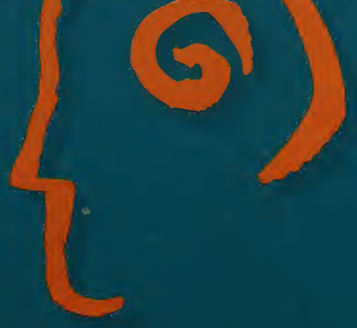
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The drives are listed from best overall performance (top) to worst. To determine rankings, we indexed overall performance numbers against the fastest drive, index numbers are to the left of product names.
We measured each drive's ability to duplicate a 3.2MB 4th Dimension file, write a 3.2MB file to the optical disk, read a 3.2MB file on the optical disk, open and save a 3.9MB Photoshop file, open and save a 2.6MB PageMaker file, and conduct a 73.4MB Retrospect

Overall Fastest		Duplicate (in seconds)	Write (in seconds)	Read (in seconds)	Open Photoshop (in seconds)	Save Photoshop (in seconds)	Open PageMaker (in seconds)	Save PageMaker (in seconds)	Retrospect Backup (in seconds)	Sound (in dBs)
1.00	Pinnacle Micro PMO-650 (PI)	33.49	18.29	17.88	27.77	23.75	46.66	62.4	461.0	42.2
0.86	PLI Infinity Max Optical (M)	44.72	26.60	19.11	32.25	28.64	49.81	106.8	465.4	42.1
0.79	MacDirect NuDesign Optical (MO)	47.19	33.98	15.91	36.64	35.91	50.90	142.3	570.8	43.1
0.79	Liberty Systems 115MO (MO)	48.11	33.40	15.74	37.99	36.51	52.35	128.8	568.3	40.8
0.79	DGR Technologies 128REM (MO)	47.58	33.68	15.90	36.77	36.33	51.13	145.6	570.4	38.0
0.79	Ocean Microsystems Vista 128 (MO)	48.59	34.57	15.83	36.62	36.15	51.46	145.6	571.9	45.2
0.79	MacProducts Magic 128 REM/MO (MO)	48.13	34.15	15.86	36.86	36.34	51.62	146.6	572.8	36.1
0.77	Generation Systems 128MB Optical (MO)	48.17	33.85	16.11	36.99	35.99	51.43	147.3	569.9	40.7
0.77	Mirror Technologies 128MB Optical (MO)	48.25	33.74	18.41	37.35	36.68	52.16	147.5	568.9	42.4
0.76	Relax Erasable Optical Vista Hyperspace (R)	49.95	31.89	21.86	38.16	31.13	62.93	147.0	518.0	50.6
0.75	Storage Dimensions MCO1-1000 (M)	56.45	37.05	19.44	36.60	35.94	50.36	140.5	617.7	50.2
0.72	Pinnacle Micro REO-1305 (S)	54.27	33.23	25.14	40.82	36.18	62.60	158.9	566.2	50.8
0.72	Sony RMO-S350 (S)	54.18	33.11	24.81	41.64	36.33	63.20	160.6	559.5	47.5
0.71	PLI Infinity Optical 3.5" (S)	53.81	33.20	24.78	42.91	38.77	63.31	160.2	557.5	43.4
0.71	Optima Technology DisKovery 128 (S)	54.60	33.11	25.31	43.16	36.47	68.13	160.9	564.7	49.1
0.70	Relax 128MB Optical Sierra (R)	54.12	37.46	20.58	42.30	40.17	58.62	171.9	680.2	39.7
0.70	Tulin Technology A-Hive Jr. MO-120 (R)	54.24	37.18	20.24	42.54	40.22	58.60	175.3	684.7	45.7
0.70	Mass Microsystems DataPak MO/128 (MA)	54.32	37.18	20.09	42.60	40.97	58.79	176.8	679.9	38.6
0.70	La Cie 128MB Cirrus Optical (MA)	54.31	37.37	20.24	42.60	41.43	58.30	173.4	679.9	42.4
0.70	TASS Optical World PL128 (MA)	54.18	37.59	20.45	42.83	40.65	58.96	178.5	679.1	42.0
0.70	Rodime Systems Condor 650e (R)	57.71	39.18	21.66	40.91	37.64	63.54	165.1	640.3	42.6
0.70	Rodime Systems Condor 130e (R)	54.42	37.68	20.62	43.07	41.15	59.46	175.6	694.4	40.7
0.69	Procom Technology MEOD128 (M)	54.54	34.68	24.75	42.92	37.09	68.74	212.8	576.1	48.7
0.69	MicroNet Technology SB-TMO-1000 (M)	61.96	39.30	20.26	38.59	39.74	67.78	185.1	684.8	40.7
0.68	Optical Access Access RD/Aria (MA)	58.17	38.81	20.75	45.85	43.62	59.41	176.2	709.6	40.3
0.67	[illegible] Bound [illegible]-HS (R)	62.68	39.53	24.23	39.16	66.21	177.1	677.8		47.1

Macworld Magazine, Nov. 1992 "Optical Update". Forty-three drives tested. 5.25" mechanism standings:
1) Pinnacle Micro PMO-650, 2) Maxoptix Tahiti II, 10) Ricoh Hyperspace, 28) Sony E-501, 41) Hewlett-Packard Corsair.

Trademark Owners: PMO-130, PMO-650, OHD, Optical Hard Drive, and Pinnacle Micro are Trademarks of Pinnacle Micro, Inc. ©1992. Trademarks and registered marks to their respective owners. Retail prices acquired from dealer survey 10/92.

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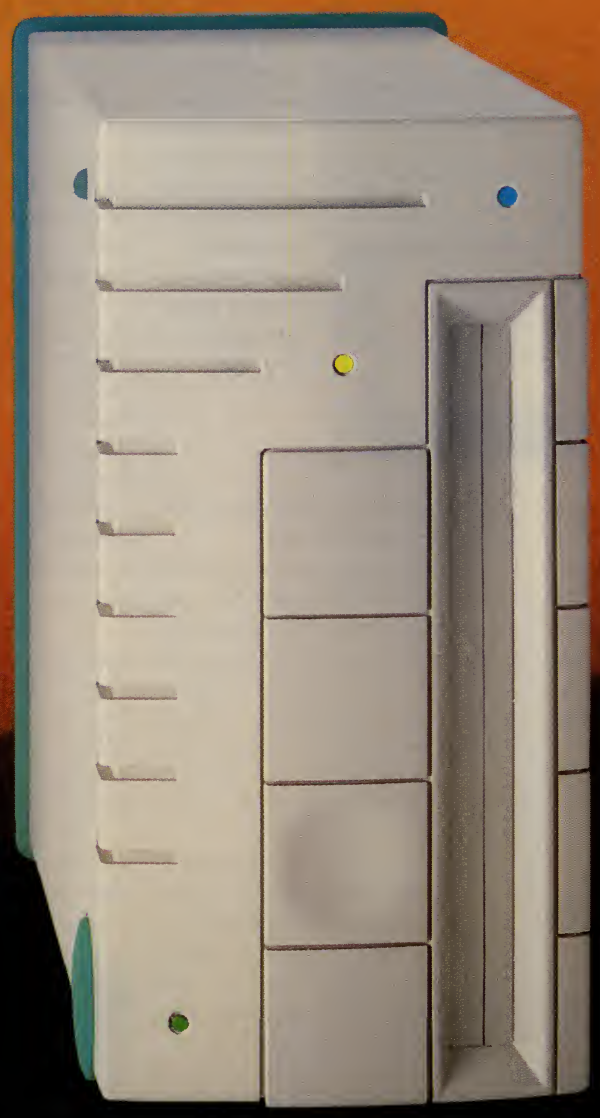
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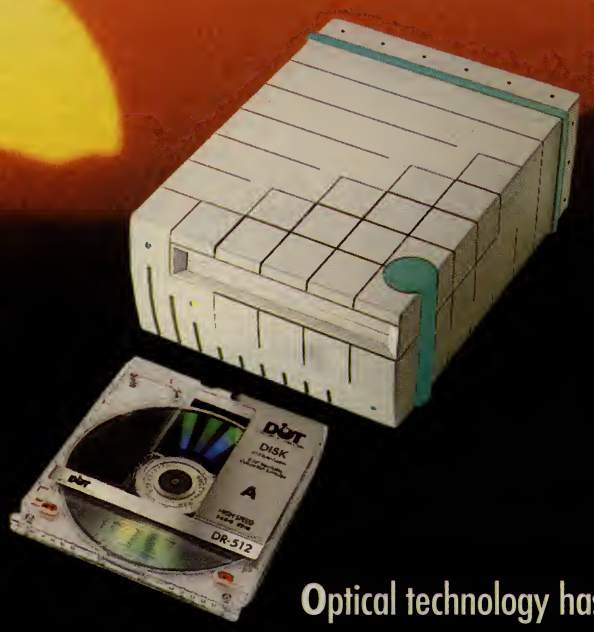
Charles Piller
Macworld

MACWORLD MW EDITORS' CHOICE



"The PMO-650 is the first rewritable optical drive we've ever tested that can get out and run neck and neck with hard disks"

Rex Farrance
PC World



TYPE: 5.25" OPTICAL
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Optical technology has many advantages - removability, reliability, infinite storage capacity, and a lower cost per megabyte than magnetic media.

COST PER MEGABYTE COMPARISON				
Drive Type	Retail/650 MB	1.3 GB	2.5 GB	5.0 GB
PMO-650 Optical Drive (1 Disk)	$4,194	$4,393	$4,770	$5,545
Magnetic Hard Drive (650 MB)	$3,745	$7,490	$14,400	$28,800
88 MB Removable Magnetic Disk	$2,394	$3,790	$6,367	$11,734

The PMO™ series are based on Pinnacle's own OHD™ (Optical Hard Drive) technology, making Pinnacle the leader in performance and innovation. There is no higher source in the industry. The PMO-130™ and PMO-650™ *are* the Twin Peaks. Plug-n-play for MAC, PC and compatibles, PS/2, SUN, HP, DEC, and Silicon Graphics. It's more than a hard drive - It's optical!

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Astound does slides, multimedia shows

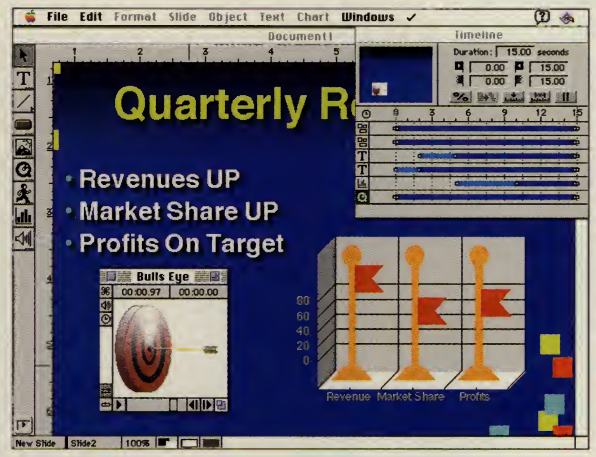
By Neil McManus

Torrance, Calif. — Gold Disk this week will introduce Astound, a new program that lets users create slide-based and multimedia presentations.

Astound retails for $399, but Gold Disk is offering the program at an introductory price of $99 through June 30.

Astound imports Aldus Persuasion and Microsoft PowerPoint presentations, and it offers traditional features such as an outliner, a slide sorter, speaker notes and output of 35mm slides.

The 24-bit-color program offers 20 drawing tools, including line, square, circle and freehand. Users can create multicolor gradients for backgrounds, objects and text. Backgrounds can also be created from imported PICT and TIFF images.



Gold Disk's Astound lets users add charts and QuickTime movies to interactive presentations. Motion and sound is coordinated in Astound's time-line window (top right).

In addition, users can import data from spreadsheets to create "live" charts. The program offers 15 business chart types, including pie, bar and scatter charts. Preset animations for charts let users create effects such as bars tumbling into place.

Text and objects can be animated along user-defined paths. Users can also import sounds, PICS animations and QuickTime movies and manipulate them with Astound's built-in sound and QuickTime editors. Objects and slides can include transitions such as wipes, dissolves and fades. Motion and sound are coordinated in a time-line window.

For interactive presentations, users can imbue objects with actions such as branching and pausing. Presentations can be saved as stand-alone self-running files with full interactivity. The program also offers multiple-screen playback.

Gil Castiano, vice president of Image Group Inc. of Santa Cruz, Calif., said Astound's Timeline feature gives him a bird's-eye view of a presentation. "It's pretty convenient to look at the whole flow of a presentation. You can see all of your transitions and see where sounds come in and out," he said.

Gold Disk is at 385 Van Ness Ave., Suite 110, Torrance, Calif. 90501. Phone (310) 320-5080; fax (310) 320-0298. □

Transverter Pro spans graphics gap, makes cross-platform PS files editable

By Neil McManus

Cleveland — A new application from TechPool Software converts PostScript files and other graphics from a variety of platforms to editable Adobe Illustrator files.

Transverter Pro, now shipping for $249, uses PostScript as a universal file format for moving vector files among applications and platforms.

After users save their graphics to disk in PostScript format, Transverter Pro uses its built-in PostScript-compatible interpreter to translate the files into resolution-independent Adobe Illustrator Encapsulated PostScript.

This method lets users pass multiple-page graphics documents between applications in the editable Illustrator format. For example, a user can save a Windows PageMaker file to disk, convert it with Transverter Pro, edit a headline in Illustrator on the Mac, then place the revised page into a Mac QuarkXPress layout.

Transverter Pro can also convert PostScript files into bit-mapped TIFF files and bit-mapped and vector PICT files. With this feature, a user could combine a CAD drawing from a Sun SPARCstation with a Microsoft Excel graphic from an MS-DOS machine into a Microsoft Word document on the Mac.

The new TechPool program also lets users convert files in batches, add screen previews to any PostScript file and unlock Aldus FreeHand EPS files.

Transverter Pro requires a Mac II or better with at least 4 Mbytes of RAM, a hard drive and 32-bit QuickDraw. The company also offers a Windows version of the program.

TechPool Software is at 1463 Warrensville Center Road, Cleveland, Ohio 44121. Phone (216) 291-1922; fax (216) 382-1915. □

Polaroid picking up the pace with latest 24-bit film recorder

By Matthew Rothenberg

Cambridge, Mass. — Polaroid Corp. has introduced a new version of its CI-5000 film recorder that prints up to twice as fast as its predecessor and costs about 10 percent less than the original model.

The CI-5000S, available now for $5,495, replaces the $5,995 CI-5000. The new configuration includes a built-in accelerator board manufactured by Polaroid. According to company benchmarks, the CI-5000S outputs a 2,000-line image in as little as one minute, 30 seconds, which is half the time its predecessor required to output the same image.

The new version also features upgraded software drivers, developed by GCC Technologies Inc., that support background and batch printing as well as faster rasterization and data transmission, Polaroid said.

Like the original CI-5000, the CI-5000S processes 33 bits of RGB (red, green, blue) information per pixel and converts this data to output optimized 24-bit-color or eight-bit gray-scale images at resolutions of up to 3,600 by 4,096 pixels.

It includes SCSI and Centronics parallel ports and ships with a 35mm camera back. Camera backs for AutoFilm, 3.25-by-4.25-inch pack film and 4-by-5-inch Polaroid prints range from $299 to $599 each, and an instant slide processor and mounter is $467.50. Bulk- and motion-picture-film camera backs are available from third-party vendors.

Mac users of the CI-5000S must purchase Polaroid's $599 Macintosh Accessory Kit, which comprises a driver, SCSI cable and documentation. The company said users who want PostScript output should buy VBS Professional Output Manager, Polaroid's $495 Mac-based software RIP (raster image processor).

Polaroid Corp. is at 575 Technology Square, Cambridge, Mass. 02139. Phone (617) 577-2000 or (800) 225-1618; fax (617) 577-5756. □



The Polaroid CI-5000S film recorder outputs 24-bit-color or eight-bit gray-scale slides at resolutions of up to 3,600 by 4,096 pixels.

Agfa steps up to PostScript Level 2 with Viper software RIP

By Matthew Rothenberg

Ridgefield Park, N.J. — Agfa next month will strike with Viper, the company's first Adobe PostScript Level 2 software RIP.

The $9,995 RIP (raster image processor), which Agfa unveiled at Seybold Seminars 93 in Boston last month, uses the Level 2 version of CPSI (Configurable PostScript Software Interpreter) technology from Adobe Systems Inc. of Mountain View, Calif., and runs on 68030 Macs or later models.

The RIP drives the company's $38,500, 3,000-dpi AccuSet 1000 imagesetter as well as its $16,450, 2,400-dpi ProSet 9400 and $26,450, 2,400-dpi ProSet 9550 models. It sends rasterized images to the output device via an external interface box that attaches to the Mac SCSI port.

Viper supports all features of Level 2, such as composite fonts, as well as Agfa's Balanced Screening Technology, software designed to eliminate moiré patterns. The RIP will ship with 35 Type 1 fonts, Agfa said.

Viper also supports PixelBurst, an application-specific integrated circuit from Adobe that can run high-end output devices at up to 100 pages per minute from 68040 Macs, Sun SPARCstations, and 486 IBM PCs and compatibles. PixelBurst is available from Agfa on a $12,495 NuBus card manufactured by RasterOps Corp.

Agfa has also acquired CristalRaster, a screening technology developed by Forschung und Technik GmbH of Essen, Germany. This software for Agfa RIPs will ship in the fall.

Agfa, a division of Miles Inc., is at 100 Challenger Road, Ridgefield Park, N.J. 07660. Phone (201) 440-2500; fax (201) 440-8187. □

Read my clips.

THE BOTTOM LINE

The HP ScanJet IIc sets a new standard for affordable color scanners. Its engine is fast and well-engineered, and HP's innovative color-callibration software makes hassle-free, "true"-color scans a reality. Prices at less than $2,000, the HP ScanJet IIc is a best buy in its class.

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Top honors in every scanner category.

WINNING COMBINATION

To test the HP ScanJet IIc, we used the same set of tests we used for our most recent color-scanner lab report. The results showed **HP's new scanner to be the best in its class in both hardware and software. The ScanJet impresses from the moment you open the box.** Other scanners use a removable screw that locks the scan head for shipping, but HP uses a locking lever that's built into the scanner itself. There's no screw to lose, and the lever is so easy to use that you'll find yourself locking the scan head more often, thereby increasing its life span.

and black-and-white photos, **the ScanJet IIp is an exceptional product.** The scanner is just 16 inches l... wid...

the scan head, and color accuracy showed **the HP ScanJet IIc to be a top performer.** In addition to scanning at an optical resol...

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TOP-NOTCH HARDWARE TEAMED WITH INNOVATIVE SOFTWARE MAKES HP'S NEW COLOR SCANNER A WINNER.

The HP ScanJet IIc *uses a one-pass scanning method that makes it one of the fastest color scanners we've seen.* It also provides time-saving color previews that dynamically display any changes you make to the scan, such as exposure, hue, and saturation modification.

1992 Diamond Awards

For an all-around scanner offering high-quality color and black-and-white images, true 400-dpi resolution, and good basic scanning software, **HP's ScanJet IIc can't be beat.**

"We were extremely impressed..."

Hewlett-Packard's ScanJet IIp sets a new standard for affordable desktop gray-scale scanners. From its striking comp... design to...

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We'd hate to brag. So we'll let the Mac press do it for us.

Macworld awarded both the HP ScanJet IIc and IIp their *World Class Award*, and named the HP ScanJet IIc as the *Best Color Scanner* for 1992, and the HP ScanJet IIp as the *Best Black & White/Gray-Scale Scanner*. While *MacWeek* gave their prestigious *Diamond Award* to the HP ScanJet IIc. Speed. Simplicity. And accuracy were all applauded. It's no wonder. HP's single-pass scanning delivers both lightning-fast speed and precise color registration. TWAIN support allows scanning without having to switch between applications. And HP AccuPage technology with 400-dpi resolution can tackle the toughest OCR challenges. What's more, capabilities this advanced have never been this affordable. List price on the HP ScanJet IIc is just $1,599. The HP ScanJet IIp is just $879. And right now, the HP ScanJet IIc includes Adobe™ Photoshop LE.

Impressed? Don't just take our word for it, or even the Mac press's. Attend one of our scanning seminars that will be held April through September, 1993. To find out more about the HP ScanJet IIc and IIp or seminars in your area, call 1-800-SCANJET, Ext. 7364*. And judge for yourself.

HP ScanJet IIc



HP ScanJet IIp



HEWLETT PACKARD

QuickTime moves beyond borders

New system creates navigable movies

By Raines Cohen

San Francisco — Radiant Enterprises Inc. last week shipped a camera-control system that lets users create navigable QuickTime movies.

The $2,495 CommonSense CAM includes a modified CommonSense CNX AppleTalk-control unit, plus a computer-driven tilt-and-swivel base for a user-supplied camcorder.

Also included in the package is a HyperCard stack that associates individual video frames with particular camera angles. This lets users explore a space by clicking on the edges of a movie window. For example, clicking to the right switches to a view slightly to the right of the current one.

The HyperCard stack, developed by Apple's Advanced Technology Group, requires no special hardware to play back navigable movies.

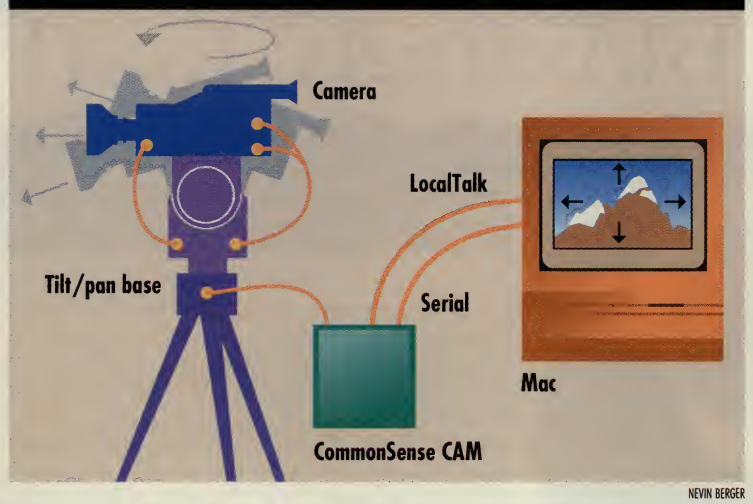
The stack controls the tilt-and-swivel base — and, in turn, the camera — to record all the angles of a space. While digitizing the video, the stack uses Abbate Video Inc.'s VideoToolKit to navigate the tape (using timecode) to capture each angle. This approach does not require digitizing equipment at the time the tape is made.

Alternatively, users can digitize images from the camera during the scanning process. This method works with cameras that don't support timecode.

Potential applications of the CommonSense CAM system include multimedia distribution of museum exhibit spaces and documentation of real estate, construction and crime scenes, Radiant said.

Radiant Enterprises Inc. is at 1714 Stockton St., San Francisco, Calif. 94133. Phone (415) 296-8040; fax (415) 392-6860. □

Making navigable QuickTime movies



NEVIN BERGER

Developers adopt Opcode's OMS as Mac driver standard for MIDI

Extension manages multiple music devices

By Craig O'Donnell and Kirsten L. Parkinson

Las Vegas — In a move that may bring harmony to Mac music applications, MIDI developers last week banded together to endorse a new open standard based on software from Opcode Systems Inc.

At the National Association of Broadcasters show here, the company renamed its Opcode MIDI System (OMS) extension the Open Music System.

MIDI (Musical Instrument Digital Interface) is a standard protocol for music synthesizers and sound processors. OMS provides a single MIDI driver and a central location for storing information about MIDI devices. Any OMS-compatible application can then access this information.

As new Mac CPUs are released, MIDI compatibility can be added by updating just OMS rather than each application. OMS also supports MIDI multitasking and hundreds of MIDI channels.

Several music software and hardware developers, including Passport Designs Inc., Digidesign Inc., Roland Corp. US, Emagic and Steinberg Jones, have said they will support the new standard in their products. Sources said at least one high-profile consumer multimedia developer is likely to sign on as well.

"Basically, [OMS] will make everything transparent," said Jan Hammer, a New York musician and composer who wrote the theme for "Miami Vice." "I love computers, but there are times when I'm working on music and I can't start thinking about ports and channels and waste time on the tech stuff. I think [OMS' acceptance] is comparable to when MIDI was accepted as a standard."

Opcode has also announced OMS 2.0, due by the end of the third quarter, which will include interapplication communications for MIDI programs, timing services and serial-port independence. Future revisions of the software will also include code from developers other than Opcode.

Opcode Systems Inc. is at 3950 Fabian Way, Suite 100, Palo Alto, Calif. 94303. Phone (415) 856-3333; fax (415) 856-3332. □

Faster upgrade extends scope of Multi-Ad Search

Version 2.0 handles 10 catalogs at once

By Carolyn Said

Peoria, Ill. — Multi-Ad Services Inc. last month shipped a new version of Multi-Ad Search, one of the original entries in the now-burgeoning field of image-cataloging programs.

Search 2.0, priced at $249, has been rewritten from the ground up, Multi-Ad said. The new version features a faster database engine and cleaner user interface, according to the company.

Search 2.0 catalogs can contain 160,000 images, up from 32,000. Users can now open and search as many as 10 catalogs at once. The program adds support for PC Encapsulated PostScript and JPEG (Joint Photographic Experts Group) formats.

When a user clicks on a thumbnail of an image, Search 2.0 can automatically launch the application that created the image. The program can recatalog an image after it has been modified in its native application.

Search 2.0 can find art on local volumes or servers, and multiple users can access it on a network.

New printing features make it easier to output print catalogs, keyword lists, thumbnails and actual images from within the program.

Search 2.0 uses a custom Apple event that lets users place images in desktop publishing programs automatically. Multi-Ad Creator and a QuarkXTension now support the Apple event; a forthcoming Addition for Aldus PageMaker will also support it.

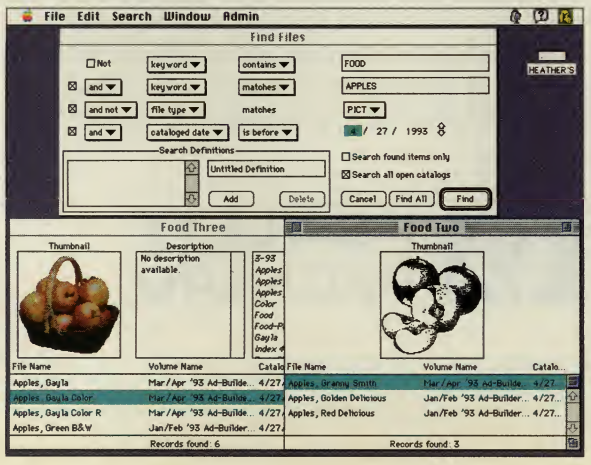
"Search 2.0 is fast and makes it very easy to locate things," said Monica B. Hubert, systems manager of advertising at The Boston Globe.

"It does a good job capturing all the artwork needed for a particular job; we just pick the images, and it pulls them into a folder," Hubert said. "Then we just select the folder, and the entire contents appear, so we can immediately start placing the images."

Users can upgrade for a $9.95 shipping-and-handling charge. The company is offering five-packs of Search 2.0 for $935 and 10-packs for $1,800.

The original version of Multi-Ad Search was written by Doug Dawirs. He also wrote Aldus Corp.'s Fetch, one of Search's primary competitors.

Multi-Ad Services Inc. is at 1720 W. Detweiller Drive, Peoria, Ill. 61615-1695. Phone (309) 692-1530; fax (309) 692-6566. □



Version 2.0 of Multi-Ad Search, an image-cataloging program, features a more streamlined interface and a faster database engine.

Linus-M 3.0 adds color support, faster tracing of scanned images

By Kirsten L. Parkinson

Nashua, N.H. — URW last month released Linus-M 3.0, an upgrade that adds color support to the $349 auto-tracing program.

Linus-M automatically creates an outline of scanned graphics or logos that users can modify using the program's built-in drawing capabilities. The final image can be saved as an Encapsulated PostScript, PICT or TIFF file.

New features in Version 3.0 include:

- **Color support.** Users can now scan and modify both color and gray-scale images. Version 2.5 supported only black-and-white graphics.

"Previously you couldn't work with a color image at all," said James Montalbano, president of Terminal Design Inc., a New York design company. "You had to have a pretty high-contrast black-and-white image."

- **Multiple undo.** Linus-M 3.0 offers as many as eight levels of undo.
- **Speed improvements.** The program creates outlines of scanned images as much as 75 percent faster than the previous version, URW said.

Other new features include System 7 compatibility and support for Mac Quadras.

Unlike Streamline, a competing product from Adobe Systems Inc. of Mountain View, Calif., Linus-M uses a proprietary line format instead of Bezier curves to trace designs and place manipulation points. Streamline lacks image-manipulation tools, so users of the Adobe software must export outlines to a drawing program such as Adobe Illustrator to edit them.

"What I like about Linus-M is that it's much more accurate" than Streamline, Montalbano said. "When you work with Bezier, I think sometimes you're making a compromise in terms of drawing a curve. Linus-M just picks up every little nuance of a logo or letterform."

Upgrades are $99.

URW is at 4 Manchester St., Nashua, N.H. 03060. Phone (603) 882-7445; fax (603) 882-7210. □

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Yamaha gets in Mac groove with multimedia tool set

By Kirsten L. Parkinson

Buena Park, Calif. — Long a leader in the music industry, Yamaha Corp. of America is preparing a sound-production bundle tuned to Mac multimedia.

The company next month will ship Hello!Music!, a $449 package that bundles Yamaha's new CBX-T3 Tone Generator with Turbo Trax software from Passport Designs Inc. of Half Moon Bay, Calif.

The Tone Generator is an external module that can input, mix and play back sounds when connected to the Mac's serial port. It contains 202 built-in 16-bit instrument sounds and digital drum kits.

The device is compatible with the General MIDI (Musical Instrument Digital Interface) format and includes an audio input and two audio outputs as well as three MIDI ports.

A built-in digital signal processing feature will let users select from among six digital reverb settings to make sounds seem as if they are being played in different types of rooms, such as a large concert hall.

Passport Designs' Turbo Trax package retails separately for $99.95. It includes Trax, the company's music-sequencing software; MIDI Player, which lets users mix and edit MIDI tracks; and QuikTunes, a collection of MIDI sound clips.

Yamaha last week released the CBX-S3, a $299.95 pair of speakers, and the CBX-K3, a $399.95 MIDI controller keyboard.

Users can connect the speakers directly to the Tone Generator or the Mac. Each speaker includes three input ports. The 49-key CBX-K3 features adjustable touch sensitivity. It lacks built-in sounds but lets users compose music that can be played back via the Tone Generator or another interface.

The Consumer Products Division of Yamaha Corp. of America is at P.O. Box 6600, Buena Park, Calif. 90620. Phone (714) 522-9240; fax (714) 522-3913. □

Lapis polishes up NTSC, PAL video cards

L-TV video encoders display on VCRs, TVs

By Nathalie Welch

Alameda, Calif. — Lapis Technologies Inc. last week shipped versions of its L-TV video-encoder card that support both composite and S-video devices.

The new L-TV Pro series comprises two cards that can drive any television, video monitor or VHS VCR in four-, eight- and 16-bit modes.

The $499 L-TV Pro NuBus card is compatible with the Mac II, Quadra and Centris series as well as the Performa 600.

The $449 L-TV Pro LC card fits the processor direct slot of the Mac Color Classic, the Mac LC series and the Performa 400.

Both models are available in configurations that support either the NTSC or PAL (European) standard. Each card supports a maximum resolution of 640 by 480 pixels in NTSC and 704 by 508 pixels in PAL.

The L-TV Pro cards come with Lapis' TV-Show software, which lets users switch among four modes: Video Recording, used to record the Macintosh screen to videotape; Presentation, used to display the Macintosh screen on a TV or video monitor; Dual Display, which lets the television and Mac display separate windows or applications simultaneously; and Television Only, which lets a TV monitor be used in place of the Macintosh screen.

Lapis continues to offer the original $349 L-TV video-interface card, which supports NTSC video signals and plugs into the PDS of Mac LC models and the Performa 400.

Lapis Technologies Inc. is at 1100 Marina Village Parkway, Suite 100, Alameda, Calif. 94501. Phone (510) 748-1600; fax (510) 748-1645. □



Lapis' new L-TV Pro series of video-encoder cards can display Mac output on TVs, video monitors and VCRs.

CDs natural selection for clip art: Four discs feature flora, fauna

By Ian G. Jacobs

San Francisco — Mac users who want to add something wild to their presentations will be able to look to four new CD-ROM collections of flora and fauna.

▶ **Digital Imaging Associates** last month released a disc comprising more than 1,700 PICT images of plant life in the Appalachian mountains.

The $195 Appalachian Flora CD-ROM contains 72-dpi images of bark, fungi, trees and wildflowers in eight- or 32-bit color.

Digital Imaging's license for the CD-ROM allows unlimited users in one building to use the images in presentations and documents.

▶ **Aris Multimedia Entertainment Inc.** last week shipped the first of its CD-ROMs to use SuperMac Technology Inc.'s CinePak software, which offers compression ratios of up to 25-to-1.

Deep Voyage, priced at $39.95, contains 100 PICT images of underwater life and shipwrecks. Each image is available in eight- and 24-bit color at a resolution of 640 by 480 pixels.

The disc also includes 25 QuickTime movies and 100 snd resources of underwater noises.

Aris next month will roll out its Tropical Rainforest and Full Bloom CD-ROMs, also $39.95 each.

Like Deep Voyage, each disc will feature CinePak compression and will include 100 PICT images, 25 QuickTime movies and 100 snd resources.

Digital Imaging Associates is at 10153 York Road, Suite 107, Hunt Valley, Md. 21030. Phone (410) 628-9200 or (800) 989-5353; fax (410) 628-0915.

Aris Multimedia Entertainment Inc. is at 310 Washington Blvd., Suite 100, Marina Del Rey, Calif. 90292. Phone (310) 821-0234; fax (310) 821-6463. □



Aris Multimedia Entertainment's Tropical Rainforest CD-ROM contains 100 PICT images, such as this bird. The disc also contains 25 QuickTime movies and 100 snd resources.

SCREEN TEST

Mac-generated videos aid space station construction



Huntington Beach, Calif. — A McDonnell Douglas engineer is using Mac animation to create a series of videotapes that will give NASA feedback on the company's progress in building Space Station Freedom.

To produce the tapes, Chip Pedersen, senior technical animator with McDonnell Douglas Corp.'s Space Station division here, constructed "a little animation studio" comprising a Quadra 900, two Quadra 700s and off-the-shelf software.

The process of building the station involves several manned space shuttle flights that are mapped out by McDonnell Douglas engineers using CAD software. Pedersen re-creates these CAD files on the Mac to animate each flight.

"What I do is rebuild the entire space station inside the Mac in three-dimensional geometry," Pedersen said. "Then I choreograph the motion of the shuttle's remote manipulator arm as well as the motion of the astronauts outside the shuttle.

"The intent is to show how they are going to assemble the station in space," he said.

Pedersen uses MacroModel and Swivel 3D Professional from Macromedia Inc. of San Francisco for 3-D modeling; The Electric Image Animation System from Electric Image Inc. of Pasadena, Calif., for animation and rendering; and Adobe Photoshop for paint effects.

The individual images are eventually transferred frame by frame to a professional videotape recorder controlled by the Mac using Truevision Inc.'s NuVista card and Diaquest Animaq software.

Besides using the videotapes itself, NASA has distributed copies to members of Congress and national news agencies.

In addition, a preliminary version of an assembly-sequence video is being shown as part of the Space Station Freedom exhibit at the Smithsonian Institution's Air and Space Museum in Washington, D.C. At a time when the Clinton administration is debating funding for the space station, such a public showing may provide crucial publicity for the project. — By David Miller

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While desktop color has improved dramatically in recent years, none of the color-management systems available provides a complete solution. What's in store for the user is the topic of our main story, a round-table discussion among the top color experts. We also look at a proposal for a 48-bit standard (see Page 45) and survey the battle among ink-matching systems (see Page 48). Look for discussion about the HiFi Color Project and the new Functional Interpolating Transformation System file format in future issues.

Panel reflects on past, predicts future of color management

Edited by Kurt Carlson and Karen Houghton

In January, Apple released ColorSync, its color-management system extension. The release signaled to users and developers Apple's commitment to helping solve the color-management dilemma facing color professionals and nonprofessionals. However, not all the pieces of the puzzle are in place yet, and users are asking the developer community, "When and how are color input and output going to match?"

On March 19, MacWEEK held a round-table discussion on color management with some of the top experts in the field. The participants were Rudy Berger, president of Savitar Inc. of San Francisco; Jan de Clippeleer, R&D manager for color applications software development at Agfa, a division of Miles Inc. based in Ridgefield Park, N.J.; Ed Granger, principal scientist for color management at Light Source Inc. of Larkspur, Calif.; Jim King, director of advanced technology at Adobe Systems Inc. of Mountain View, Calif.; Gerald Murch, director of imaging systems at Apple; Robert Poe, team leader for algorithms, analysis and color science at KEPS Inc. of Billerica, Mass.; and Adam Stock, product manager for EfiColor products at Electronics for Imaging Inc. of San Mateo, Calif. MacWEEK contributing editor Bruce Fraser served as moderator.

Fraser opened the discussion by asking, "Where is color management today, where is it headed, and — most importantly — how can we get all of the current color-management products to interact sensibly?"

The way we were. Apple's Murch began by describing the history of color management. "Users were so caught up in the excitement surrounding the first color printers that most overlooked the fact there was no discernible relationship between the image on the monitor and the printed output," he said. It soon became obvious there was no way — yet — to globally address the problem of matching color throughout the production chain, Murch said, so manufacturers began to develop solutions for their own products.

The problem was approached next at the application level, in an attempt to bridge system components. Now, Murch said, "we understand the problem enough to migrate some [color-matching] capabilities to the operating system." This, he said, "will trigger the next round of color-management facilities." From Apple's perspective, ColorSync was built as a minimal framework to permit third-party developers to add value to its capabilities.

Adobe's King said there are two things happening at the moment. "We're establishing an overall system design, which includes a workstation with color monitor, scanner, color output device, software and remote connections," he said. "We're also trying to establish an economic model — how much are users willing to spend, and for what?" If we can do that, King said, then we can invest the money and provide the solutions. "The process for both at this moment is by experimentation."

Users' point of view. Although it's currently possible to connect components and produce color documents, Fraser said it is not yet possible to get color to match between these devices, unless you're working within one vendor's closed environment.

Sparking the first note of controversy, Agfa's de Clippeleer proposed providing tools and standards so that the user can do the color matching.

King said, "We need to be very careful when we talk about matching to take into account what the intent of the user is and what constitutes a match." He said that current solutions enable some users to match scanned input to their monitors or output and be perfectly happy with it. "For another class of users, that same result is totally unacceptable." The difference, he said, is intent. If the file requires exact output, King said, "that's probably not going to happen with current setups." He said PostScript is focused on matching consistently across devices.

KEPS' Poe acknowledged that there is a clear need for a better solution but asked, in reference to color-management systems: "Why do we need this additional stuff in our computer to glue components together? If users are getting a profile from one vendor for their scanner and a profile from another vendor for their printer, how do these profiles interact with each other in a predictable way?" This leaves us, Poe said, with even more chaos than before.

Savitar's Berger said color management must be a system-integration issue and that the user does not want another tool to make it all work.

King agreed. "The user doesn't

want a color-matching system — the user wants the colors to match in the first place." He predicted that today's bolt-on solutions will disseminate into a distributed system that includes ColorSync and PostScript Level 2, as well as the scanner.

Transferring color values. Leading the discussion toward specifics, MacWEEK's Fraser suggested that missing from the equation is a file format or some way of transferring images from one system to another carrying color values. This would allow the user to work in any color space.

Supporting the idea, EFI's Stock proposed that getting from one color space to another was the responsibility of the color-management system, and the actual color space is irrelevant. "The user just cares about the contents of the file. If I didn't create it, then I'd like to see it the way the creator saw it," he said.

To accomplish this, EFI has proposed MCT, or Metric Color Tag, specification. Stock described this as a ColorSync profile extended to TIFF, which could also be extended to PostScript. MCT builds into a file tag information to get to a device-independent color space. "What people really don't want is another format," Stock said. "They want to make sure that when they view and print a color, it looks the same as the creator saw it.

"When you specify a Pantone color," he said, "the meaning of the color is the color in the book. However, when you place a graphic that was created on your computer, the meaning of the color is what the user saw on the screen.

"Clearly there are different classes of users who look at color differently. In some markets, color matching between a proofing printer and high-resolution output is important, while in others, matching between the monitor and printer is important." This was the impetus for MCT, Stock said.

In discussing the challenges encountered while developing a standard for PostScript Level 2, Adobe's King used an analogy of the metric system. "Everyone had a reason as to why they couldn't use [the metric] standard." The difficulty, King said, is the requirement for new system components that support a particular standard, which may require hardware or software. "One is costly, the other one is going to take time," he said, "neither of which you want to do."

Adobe realized it would need to work with components as they exist, somehow accommodating existing color systems. "What do you do," King asked, "when you cannot convert the whole world to the 'metric' color system?"

Adobe's answer was tagging. The PostScript Level 2 command "setcolorspace" records the coordinate system used to derive color values. Rather than getting agreement on a standard color space, an impractical task, said King, "all I want to know is what system you're working on."

Who will set standard? Savitar's Berger said that standards developed through committees are often overtaken by de facto standards before they reach the market, as was the case with PostScript.

Light Source's Granger said there is a whole segment of color management that has been rolling along but hasn't gotten much attention: the IT8 standard. (The IT8 standard is a manufactured target, both print and transparency, accompanied by a digital file containing the color values.)

"My feeling is that there's an awful lot of very excellent tools that we really need in this industry to make this successful," Granger said. "I think we have to use the standards that have been developed by IT8." He said an original target is going to be extremely important. "Whether [IT8] will be part of ColorSync, PostScript or whatever, these represent what you'd call the nails and the boards that you use to build a house. These tools are there, and I think it really is upon all of us to start looking at it and say, 'Well, do we really need to reinvent all of this?' And the answer is no, if we're going to make this market occur in the next year or two."



"If users are getting a profile from one vendor for their scanner and a profile from another vendor for their printer, how do these profiles interact with each other in a predictable way?"

— Robert Poe (KEPS)

King said that Adobe has had an association with IT8. "A lot of the activity there has to do with calibration. There are facilities in PostScript Level 2 to do calibration, and those things that are done in IT8 would be helpful in calibrating Level 2 devices. But I don't think that will be very valuable."

Granger replied that IT8 targets relate to PostScript Level 2 more as a way a person would use the mechanisms that are in PostScript Level 2, "so I don't think there's any integration necessary. I think the IT8 committee could teach people how to use the facilities in PostScript Level 2 more wisely," Granger said.

Unaddressed issues. KEPS' Poe said: "We're talking about different parts of a general problem here — file formats, tags, characterization and how to specify it. I think we're trying to discover what precisely is the kind of information — units, coordinate system or something beyond that — that needs to be communicated."

Poe offered an example where the same image is output from two different printers on different papers. One comes out darker than the other. "Do you want them to match side by side in a color-metric way?" he asked. "Or do you expect the observer to look at each one individually and want the best possible color reproduction on that individual print?"

Poe said vendors must figure out some way to communicate across those boundaries. "The use of tags may be very useful in this, but we have to decide what kind of tags we need in addition to the ones that are already there." Poe said that KEPS has been working on a proposal for an interchange mechanism and offered to show it to the other participants so KEPS could get feedback on it, and "we could try to work through some of these other issues regarding intent and measurement conventions."

King responded: "I don't think we need another proposal, I think we need to stand on each other's shoulders. I wish we didn't have three or four standards; I wish we had one."

Adobe and Apple have been working to get ColorSync device profiles and the Level 2's setcolorspace dictionaries to look more alike. King said that although new ideas are good, "I've been shipping these products for two years, and I don't want to go back and do incompatible things. The last thing I want to see is another proposal for tag information."

Poe responded that KEPS is not proposing a whole new set of tags. "In fact," he said, "there's no file format associated with what we're doing. We're simply trying to find certain conventions concerning issues that we think have gotten dropped out up until now."

Appearance model. Savitar's Berger mentioned Granger's ATD (achromatic, tritanopic and deuteranopic) color model and asked Granger how this model plays into current color-management schemes.

See Round table, next page



"The user just cares about the contents of the file. If I didn't create it, then I'd like to see it the way the creator saw it."

— Adam Stock (EFI)



"So far we've adopted CIE matching because that was really all that was available. It was never intended for matching appearance, and yet appearance matching is fundamentally what end users want."

— Rudy Berger (Savitar)

PHOTOS BY ED KASH



"It's easy to prove that if you stay with the generic part of the ColorSync profile, you leave some color quality on the table."

— Jan De Clippeleer (Agfa)

Round table

From previous page

Granger said ATD works by imitating the human visual system. "I always use Black and Decker orange as an example because [the company] is really persnickety about getting its logo right," he said. "What's important about Black and Decker orange is that it comes out solid and has absolutely the right hue angle for human vision. Most people couldn't tell the [color] saturation if they had to."

Granger said that if he balances the dye set so that two images' lightness appearances match, and if he matches the red and green hue angles, the two images will match.

"Now, what's that tell you?" Granger asked. "You couldn't even get a linear map between these two images, yet if you hold them apart you can see no difference between them." However, when you put the two images over the top of one another, he said, you see that they are violently different. "And if you do it right," Granger said, "you'll lose only half a bit [of data] on the whole [transformation]."



Current solutions enable some users to match scanned [color] and be perfectly happy with it. "For another class of users, that same result is totally unacceptable." The difference is intent.

— Jim King (Adobe)

Is color space the answer? Agfa's de Clippeleer pointed out, "It's easy to prove that if you stay with the generic part of the ColorSync profile, you leave some color quality on the table."

Granger agreed: "Anytime you have to take information into CIELAB to do anything with it, you've got to convert it back to RGB (red, green, blue). And finally, most of the time, I have to convert it to CMYK." He said every time an eight-bit image goes through that transformation, it basically loses two bits. "Is CIELAB a good way of storing things?" Granger asked. "I don't really believe so in an eight-bit world.

"Particularly with the huge eight-bit installed base, you may be doing people a disservice by giving them only Photo YCC or CIELAB."

King was quick to answer that it isn't the color space so much as careless computations. When incoming data is converted from 12 to eight bits and then transformed, "you can't expect quality not to change," King said. "It's not so much a color-space issue as it is a precision issue."

"That's one of the reasons we went to the tagging model," King said. Host colors are tagged with the space that's used, and unchanged values are sent to the printer. There the printer transforms directly from the screen values to the printer values. "We have total control over the conversion and its precision," King said.

The rendering capability of PostScript Level 2 makes it necessary to understand appearance, Granger said. "You need to understand how to render an image for National Geographic[-quality printing] and take that same image and render it on newsprint," he said. "The only thing that's missing at the moment is PostScript for scanners."

Learning from the past. Granger pointed out that before computerized pre-press was introduced, we had almost 70 years of color-reproduction experience. "People made absolutely gorgeous images, and they didn't know a damn thing about CIE," he said.

Many craftspeople are doing separations using less than optimum tools. "They've learned some honest truths about how we should be looking at rendering images," Granger said. "These people are doing excellent work."

Color reproduction has always been a very difficult art, Poe said. "Artists have always needed a lot of experience working with the media to make good use of technology," he said. "What we're trying to do is automate that technology.

Predicting the future. If we were to visit this topic again in a year, what would be different?

"Our strategy is to support ColorSync," King said. "It is going to solve problems in getting the color out of color-management systems and into the driver so we can take advantage of it in Level 2 devices. I predict a year from now ColorSync will be the central standard and provide the framework in which we all work."

Although we can dream about systems that manage the ideal tags, de Clippeleer said, reality dictates that users will have devices that are not on the lists of supported brands. "Agfa will focus on providing users with tools so that it doesn't stay an academic matter," he said.

Poe said, "ColorSync and PostScript Level 2 are going to be successful in establishing some order, but I think there's still going to be a number of color-management systems duking it out.

"One of the real problems is that for high-quality work, the user must have calibrated devices that will remain stable over time. I don't see all of that disappearing into the operating system. Maybe someday it will disappear into the peripherals, but it's going to take awhile."

Berger sees ColorSync increasingly becoming the platform into which all the other pieces plug. "So far we've sort of adopted CIE matching because that was really all that was available," he said. "It was never intended for matching appearance, and yet appearance matching is fundamentally what end users want."



"Is CIELAB a good way of storing things? I don't really believe so in an eight-bit world. ... you may be doing people a disservice by giving them only Photo YCC or CIELAB."

— Ed Granger (Light Source)

According to Stock, this forum will be completely different in a year. "We will be talking about much more real-world issues," he said.

Murch said: "This is the kind of conversation that shows how far we've come in a short period of time. It's exciting to see that you can get a group of companies beginning to converge. We're talking about standards now. That's amazing considering where we were just a little while ago.

"If we come back to the original premise, there are a lot of different kinds of users in the Mac community. We've already done a lot for people who didn't want to be bothered with the color problem. We're also getting the attention of the pre-press experts who are recognizing the stuff that's happening on fairly simple platforms that wasn't there a year or two ago." □

"It's exciting to see that you can get a group of companies beginning to converge. We're talking about standards now. That's amazing considering where we were just a little while ago."

— Gerald Murch (Apple)



Should Mac users switch to 48-bit-color standard?

Leaf Systems President Robert Caspe thinks HDR, his 48-bit-color file format, is the answer, but others are skeptical.

By Bruce Fraser

In the current state of desktop color pre-press, there are two basic approaches to dealing with color images. The first involves scanning to CMYK format, usually using a drum scanner, and passing images composed of four eight-bit channels of CMYK through the entire production process. This is the approach favored by most pre-press professionals, who tend to think of color in CMYK terms.

The second, more pioneering approach takes RGB (red, green, blue) scans, either from a midrange transparency scanner, a flatbed scanner or, most recently, Kodak Photo CD, and passes 24-bit RGB files through the system, with conversion to CMYK (cyan, magenta, yellow, black) happening at some intermediate stage, often with the aid of a color-management system such as Electronics for Imaging Inc.'s Efi-Color or KEPS Inc.'s KCMS.

In what may be remembered as one of the more provocative sessions at Seybold Seminars 93 in Boston last month, Robert Caspe, president of Leaf Systems Inc. of Southboro, Mass., attempted to shoot both approaches full of holes while proposing his own solution — HDR (High Dynamic Range), a 48-bit RGB file format.

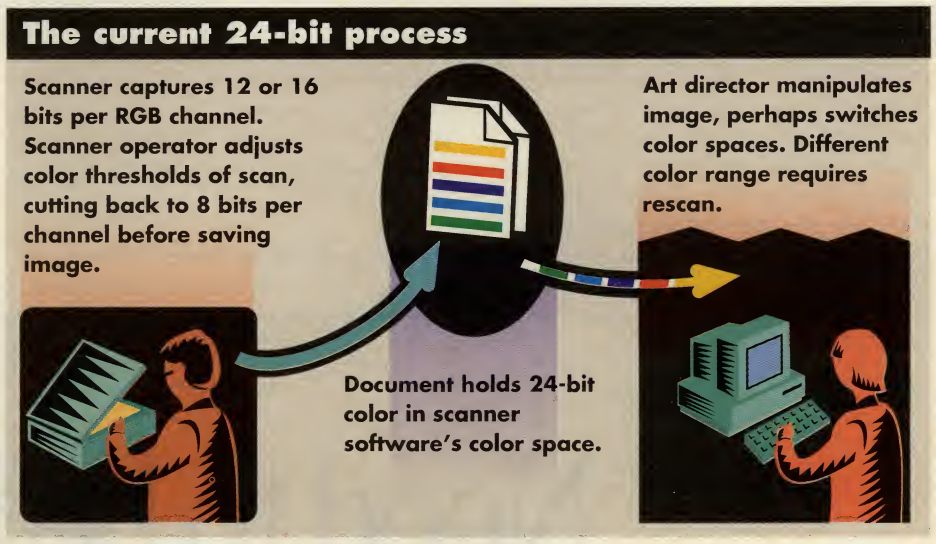
Most people's initial reaction to the mention of 48-bit color is that it's a conspiracy dreamed up by RAM and storage vendors — surely, they say, 16.7 million colors is enough. But Caspe offered some reasons for adopting a 48-bit standard.

Perceptual model. According to Caspe, Leaf's work on 48-bit color stems from two issues. The first is the need for a format that allows the desktop process to move color information between workstations without corrupting or degrading the data. "Photo CD is a good idea but a crummy execution," Caspe said. The historical basis of the 24-bit standard came from engineering limitations, he said, not imaging needs. "The whole concept of desktop publishing and the free movement of information is inconsistent with the 24-bit standard."

The second issue is the desire to understand resolution and dynamic range as they apply to human visual perception. Caspe used the development of radio as an analogy: "AM radio was low-fidelity. When it came time to define the specifications for FM, they studied the way people actually hear music. They asked the question 'What is fidelity?' and based the FM specifications on people's physiological response," he said. "We need to do the same thing for digital-color imaging."

Dynamic range. Caspe takes issue with the conventional wisdom that 256 gray levels is adequate for image reproduction. "In the real world, the capability of the human eye is about 11 f-stops, or 14 bits of data." Part of the confusion, he said, stems from the use of dMax in discussing dynamic range: dMax is a useful measurement for continuous-tone film, but it can be misleading when describing digital devices such as scanners and digital cameras. According to Caspe, "dMax tells you the height of the staircase, but what's important in a scanner is not the height of the staircase, but the number of steps it contains."

He suggested that we need 16,000 gray levels to represent the range of human vision and, in the best Einsteinian tradition, offered the following thought experiment:



Imagine you have 100 pencils, all different shades of gray, that you use to draw a picture. You may think that the result is a pretty good representation of what you see. Now, imagine that the picture is resting on a table and is illuminated by a light bulb. The light bulb is brighter than the lightest tone in the picture, and it casts a shadow that's darker than the darkest tone in the picture. Next, imagine that the picture, the table and the light bulb are in a room with a window, and outside the window the sun is shining brightly. The sun is much brighter than the light bulb, and the shadows that it casts are darker than those cast by the light bulb.

This dynamic range isn't reproducible on the printed page: it's necessary to reduce it to render it in print. The question is, who makes the decisions about how to make that reduction? The photographer obviously makes the first cut by choosing a shutter speed and f-stop. But in the current work flow, Caspe said, the scanner operator discards sixty-three sixty-fourths of the image data before it ever reaches the designer. "This is inconsistent with the standard of lossless data movement," he said. "It's pointless to throw away data unless you have to. Data throwaway is based on cost: The argument becomes, 'When is it cost-effective to stop throwing data away?' There's enough disk space, enough RAM, enough math power. We can do it."

Real-world resolution. But RAM, disk space and CPU horsepower, while cheaper than ever before, aren't free. Image files with 48 bits of data per pixel are twice as large as 24-bit files. Even allowing for the fact that RGB takes up only 75 percent as much space as CMYK, won't this make for huge and unwieldy files? This leads to the most controversial facet of Caspe's scenario.

"There's a constant ideal resolution that's independent of image size," Caspe said. "Most images are perceived at reading distance. If they're bigger, you hold them further away." He conceded that there are some applications, such as maps, where people closely examine details, but for the bulk of imaging applications, he said, "I think that more than 2,000 by 3,000 pixels is unnecessary."

A 2,000-by-3,000-pixel, 48-bit image translates to 36 Mbytes, which is hardly unmanageable on today's machines. This translates to a resolution of slightly more than 175 dpi at tabloid size. While it falls short of the rule of thumb dictating that the ratio between pixels and halftone dots should be in the 1.5-to-1 to 2-to-1 range, it isn't wildly out of the ballpark. For reproduction at smaller sizes, 2,000 by 3,000 pixels is almost certainly adequate for most purposes.

Modern mythology. "There are four myths about imaging and color," Caspe said. "If Leaf can explode these myths, we can produce good color and surpass traditional scanning. Talented designers are being hamstrung by limitations they don't understand."

The first two myths deal with resolution. "If you ask the question 'What is a good picture?' most people will answer that it's too subjective, that there is no answer to the question. That's a myth.

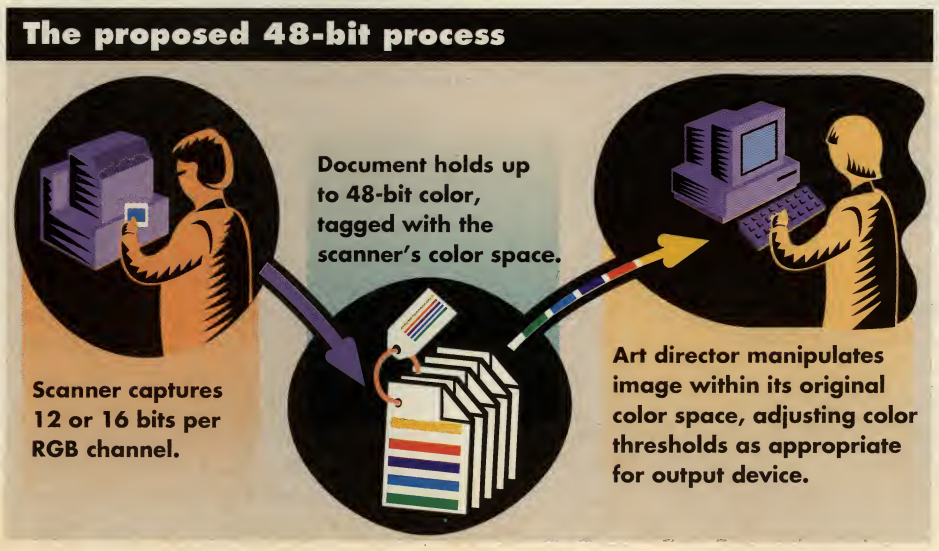
"The real answer to the question is that you don't see anything: You construct an image despite the shortcomings of the eye," he said.

Caspe said that a good picture doesn't conflict with your perceived image. "For example, if I show you a picture of a pencil that has jaggies along the edge, you'll say it's a bad picture. But if I pull a pencil out of my pocket that has jaggies along the edge, you'll say it's a good picture."

The second myth, in Caspe's view, is that larger images require higher resolution. "This goes back to the definition of a good image as being consonant with your physical understanding of the object. There are applications where you need fine structure, but for most images, high resolution is unnecessary."

The third myth is that it's important for the industry to select a com-

See 48-bit, next page



ILLUSTRATIONS BY KEVIN BERGER

48-bit

From previous page

mon color space. "Every time you do a transform from one color space to another, you lose data. Instead, you take an image acquisition system, capture all the data you can and leave it alone. Then you store a header defining the origin color space and do a single transform for output." In this scenario, the much-touted CIE set of color spaces would be used only for definition of the origin space: No conversion of RGB to CIE would be involved.

The fourth myth is that to adopt a 48-bit standard, we'd have to abandon the current 24-bit display hardware. "You don't need 48-bit displays," Caspe said. "All that's required is that the display has more dynamic range than the output."

Putting 48-bit to work. Until now, the advantages and disadvantages of 48-bit color have been largely theoretical, but Leaf is working on ColorShop/HDR, a software package that will work with 48-bit-color data captured from Leaf's Leafscan 35 and 45 models and its Leaf Digital Camera using Leaf's Acquire/HDR and Camera Export/HDR applications. While prices were not set at press time, one version of the package will run on the Mac, another will run under NeXT Computer Inc.'s NeXTstep on IBM PCs and compatibles. It's worth noting in this context that NeXTstep directly supports 16-bit-color channels.

ColorShop/HDR for the Mac will allow users to perform global tone and color correction, unsharp masking, and anamorphic distortion. It will also generate color separations, with control over undercolor removal, ink limits and selective color-correction on each plate. A further intriguing feature is that it will have the capability to learn RGB-to-CMYK transforms from other systems: If you feed it an RGB image and the same image separated into CMYK, the software will reverse-engineer the transform.

Mixed reactions. It's too early to evaluate HDR: The proof of the pudding is in the eating and, as yet, it hasn't been served.

Efi Arazi, the charismatic founder of San Mateo, Calif.-based Electronics for Imaging, remained skeptical. "In the world of reproduction, as in other markets, there will always be a market for premium solutions, but this sounds a little like the hand lotion with more lanolin."

He pointed to the low cost and high convenience of Photo CD as a mass-market solution. "If you really want to delay until the last possible moment the decision as to what data to throw away, then Caspe's right — you need 16 bits — but it seems like a solution without a problem."

David Lynn Overbey, president of Color Tomorrow, a Haiku, Hawaii-based color house, expressed cautious interest in HDR. "At first glance, it seems it could eliminate 98 percent of our rescanning images for different uses." But he questioned the ability of most art directors to make image corrections. "Just giving the art director access to 48-bit data doesn't mean they'll be able to do the corrections themselves — it's a technical process that most art directors don't understand well."

Paul McAfee, deputy director of news communications and public affairs at Eastman Kodak Co. of Rochester, N.Y., questioned the wisdom of Caspe's slamming Photo CD. "I'll let the real world provide a reality check," McAfee said. "We had presentations today from McGraw-Hill and Taunton Press explaining how well Photo CD fits their work flow and expressing their satisfaction with the quality."

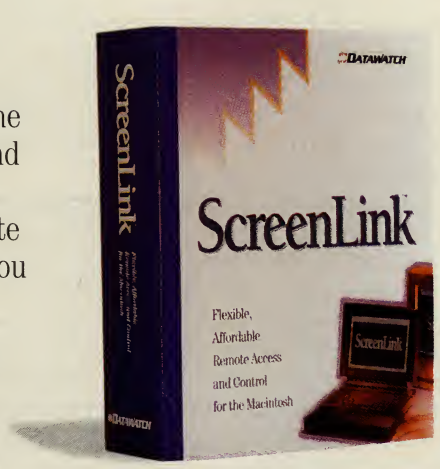
He added, "There's nothing in Photo CD that prevents us from moving to a 36-bit or a 48-bit standard if our customers demand it."

To be resolved. One of the weakest links in Caspe's argument, as he himself conceded, is the question of resolution. However, it does fit extremely well with the 2,000- by-2,000-pixel resolution of the Leaf Digital Camera. With the camera, the benefits of maintaining 48-bit data through the creative process are obvious. Images from the camera are also completely free of film grain, which is one of the main causes of artifacts when increasing resolution through interpolation on conventional scans.

If higher resolution is, in fact, required for printing, images from the camera could be resized upward after conversion to CMYK. This would avoid the problem of huge file sizes while preserving the advantages of the HDR approach.

For scanned images, the resolution question remains open, at least until Leaf begins to ship the software. Another area where HDR could prove extremely valuable is in process-color printing using more than four process colors. But until the transition is made from research project to retail product, it's too early to evaluate. For now, it's definitely an area to watch. □

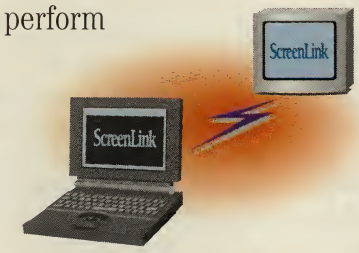
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Color-swatch systems battling for user loyalty

Can Toyo, Trumatch and Focoltone color-matching systems compete with Pantone?

By Michael Roney

When it comes to specifying corporate logos and spot color for faithful reproduction on press, Pantone Matching System and Pantone Process Color System from Pantone Inc. of Carlstadt, N.J., remain the overwhelming favorites among designers and printers, despite attractive alternatives offered by newcomers Trumatch Inc. of New York; Focoltone Ltd. of Cardiff, England; and Toyo Ink Manufacturing Co. Ltd. of Tokyo (sold in the United States by DuPont Printing and Publishing of Newark, Del.).

With the rise of Mac-based color publishing over the past few years, hardware and software manufacturers have licensed and integrated Pantone, Trumatch, Focoltone and Toyo color-selector dialogs and color look-up tables with their products.

Although there are similarities among these ink-matching systems, each has unique features and distinct advantages for certain types of design or printing situations. However, Pantone has become something of an international standard since its introduction in 1963, with 98 percent of the color-matching market, and is also keeping up with desktop technology. Do the upstarts offer enough reasons to switch?

Make me a match. Pantone offers two systems for specifying spot colors — one based on custom mixed inks and the other on process colors. Toyo is based on custom inks. Trumatch and Focoltone are both designed for process printing. All the systems are based on swatch books that show printed colors on both coated and uncoated stock. Each color swatch is labeled with a distinctive number or code and (in the case of the process systems) by its CMYK (cyan, magenta, yellow, black) components, and it can be specified using either method, whether manually or through a dialog box in a color software application.

Users can specify a spot color on screen, then send it out for printing. They can also preview specified colors on digital desktop printers that employ look-up tables or color-management systems such as Electronics for Imaging Inc.'s Efi-Color. However, comparison with the traditional swatch book is still necessary since that's still the only way to "calibrate" a four-color press with the rest of your system.

Pantone and Focoltone also feature colored specification chips that can be attached to a mechanical or proof to show a printer what a printed color should look like.

Once a job is sent to press, the printer reproduces specified colors using a special ink or by combining process colors in the recommended percentages.

Pantone boasts versatility. The traditional Pantone Matching System is based on solid-ink combinations of nine basic colors plus black and white, which, when mixed in various percentages, make up 1,012 variations, including various pastels, tints and metallic shades that can't be duplicated by process methods. Of these, 942 can be simulated with CMYK but not exactly matched. This system is best for nonprocess, one- or two-color jobs, or for additional colors on process jobs requiring a metallic or pastel shade.

The Pantone Process Color System, featuring 3,006 CMYK combinations, was designed for specifying spot color on process jobs. All screens in this system are electronically generated, using mostly industry-standard 5 percent screen gradations, with a few 3 percent screen gradations.

Color publishing applications, such as Aldus PageMaker and FreeHand, QuarkXPress, and Adobe Illustrator and Photoshop, feature a variety of Pantone selection dialogs, including the basic Pantone Matching System for specifying Pantone custom inks on coated and uncoated stock; Pantone ProSim, containing the 942 Pantone colors that can be separated into CMYK; and the Pantone Process Color System.

Pantone is also addressing the multimedia world with a Broadcast Color System for digital video. It features Pantone Matching System equivalents based on SMPTE standards. Using this system, users can calibrate RGB (red, green, blue) values for video.

Pantone is firmly entrenched in the market, and vendors may find it difficult to persuade traditional Pantone users to move to their color-matching systems. "Most designers and customers are used to using Pantone," said Sharyn Venit, cofounder of TechArt, a graphic design and production company in San Francisco, "and when we're selecting a color for our own purposes, we just come up with our own CMYK specs rather than specifying with a swatch book. We don't go to Trumatch just because it's custom-made for PostScript imagesetters. As a matter of fact, none of our clients has ever suggested using anything besides Pantone.

"Let's face it," she said, "it took designers long enough just to start using the Mac. I wouldn't expect them to switch away from Pantone any time soon.

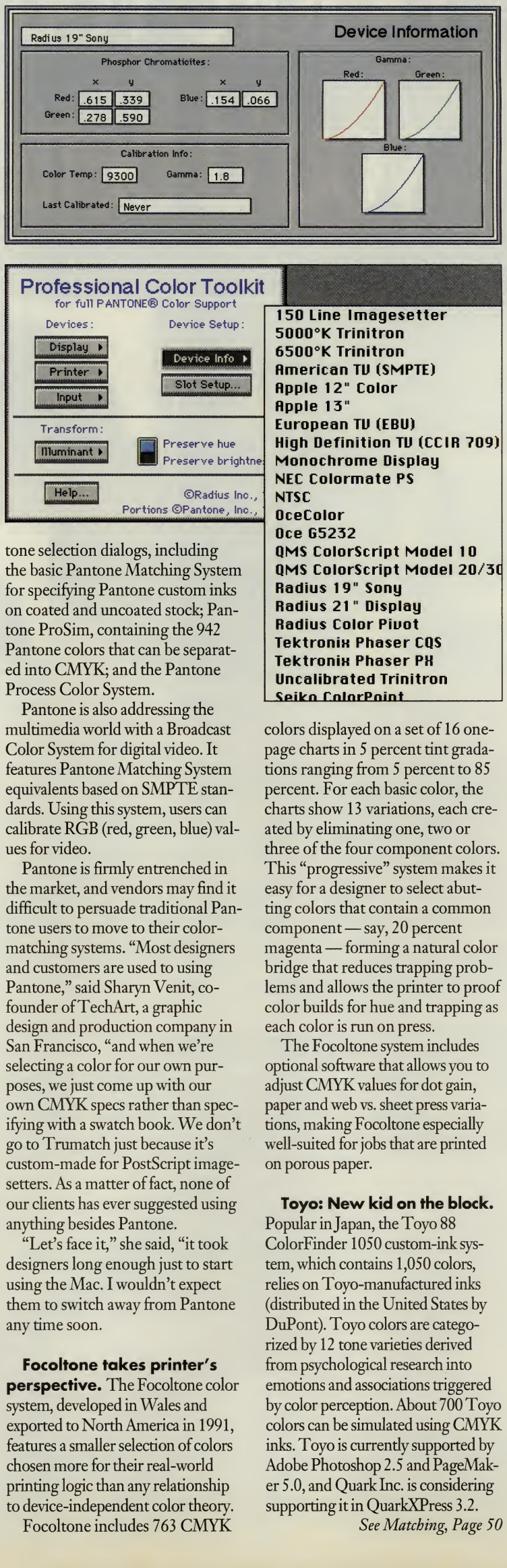
Focoltone takes printer's perspective. The Focoltone color system, developed in Wales and exported to North America in 1991, features a smaller selection of colors chosen more for their real-world printing logic than any relationship to device-independent color theory.

Focoltone includes 763 CMYK colors displayed on a set of 16 one-page charts in 5 percent tint gradations ranging from 5 percent to 85 percent. For each basic color, the charts show 13 variations, each created by eliminating one, two or three of the four component colors. This "progressive" system makes it easy for a designer to select abutting colors that contain a common component — say, 20 percent magenta — forming a natural color bridge that reduces trapping problems and allows the printer to proof color builds for hue and trapping as each color is run on press.

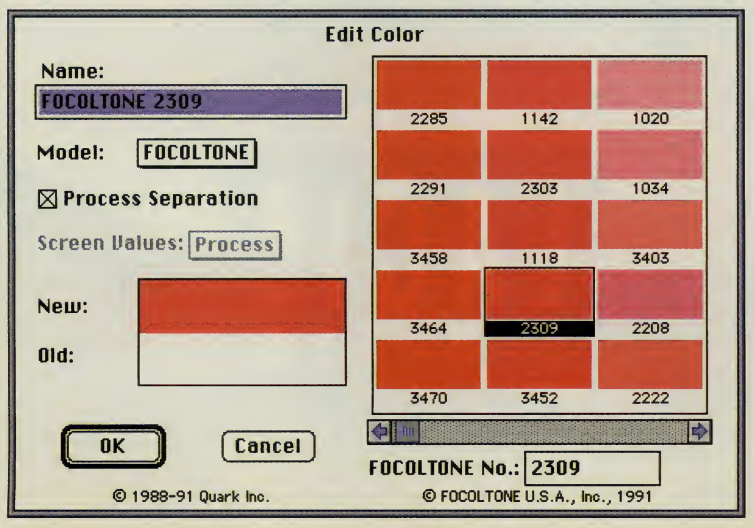
The Focoltone system includes optional software that allows you to adjust CMYK values for dot gain, paper and web vs. sheet press variations, making Focoltone especially well-suited for jobs that are printed on porous paper.

Toyo: New kid on the block. Popular in Japan, the Toyo 88 ColorFinder 1050 custom-ink system, which contains 1,050 colors, relies on Toyo-manufactured inks (distributed in the United States by DuPont). Toyo colors are categorized by 12 tone varieties derived from psychological research into emotions and associations triggered by color perception. About 700 Toyo colors can be simulated using CMYK inks. Toyo is currently supported by Adobe Photoshop 2.5 and PageMaker 5.0, and Quark Inc. is considering supporting it in QuarkXPress 3.2.

See Matching, Page 50



Pantone's Professional Color Toolkit control panel helps users match Pantone color look-up tables across applications and devices by allowing them to specify devices used (bottom). The device information command lists phosphor and gamma information for specified devices (top).



QuarkXPress currently lets users create colors based on Focoltone, Pantone and Trumatch specifications. Quark is considering support for Toyo colors in Version 3.2.

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Matching

From Page 48

"The Toyo palette has a lot of cultural influences," said Robert Jensen, a partner at Bergh Jensen & Associates, a Minneapolis design consulting company. "Its colors, especially the blues and greens, are more sophisticated, whereas Pantone [colors are] like General Motors cars from the '50s: dumb, workable and get the job done."

Jensen said that it doesn't matter if a printer is familiar with Toyo or any other specific swatch system. "If I can't find a color I want — and often there are holes in the Pantone system — I go to Toyo and can often find what I'm looking for. Then the printer will match it," he said.

Trumatch aims for digital precision. Trumatch, released in 1991, is designed specifically for the digital age. It features 2,000 process colors that range evenly through the device-independent HSB (hue, saturation, brightness) color model refined in 1931 by the CIE (Commission Internationale de l'Eclairage).

Trumatch colors are selectable from within Aldus PageMaker and FreeHand, QuarkXPress, Adobe Illustrator and Photoshop, and soon, EFI's Cachet. In each application, you can choose Trumatch colors by number or CMYK makeup from color-selector dialogs.

Designed for the precision of digital imagesetting, Trumatch colors are organized into 50 discrete hues, each with 40 evenly spaced tints and shades based on saturation and brightness. Each hue is displayed in eight tint gradations ranging from 100 percent saturation (pure hue) to 5 percent, rounded off to 1 percent targets. Each tint is shown in evenly spaced shades, gradated in 6 percent increments, based on the amount of black in the mix. This scheme allows a smoother gradation throughout the visible spectrum.

The Trumatch emphasis on digital 1 percent screens is a topic of hot debate among printing experts. Some may argue that gradations of less than 5 percent — even with electronically generated screens — are useless because press variables make it difficult to hold dots with any greater precision.

"Talk to any printer, and he will tell you that to hold even a 5 percent dot is difficult; less than 5 percent is nearly impossible," said John Humphrey, vice president of marketing for Focoltone. "Going by a scientific model like HSB is one thing, but we are printers first and foremost — we have to be realistic."

Ralph Pappas, vice president of TSO General Corp., a printer in Long Island City, N.Y., disagreed. "If we get digitally produced film that specifies 1 percent tints, we can handle it," he said. "We have electronic monitoring and inking on our press, which measures true color value rather than dot density. It ensures a match between proof and press colors and really boosts our precision."

Swatches with color calibration. The Trumatch system also includes software that creates a 30-page sample document on your desktop color printer. Using that guide, you can compare the colors produced by your printer with those in the ColorFinder, showing how close your comp will be to true on-press results. The software supports EfiColor, Apple's ColorSync and PostScript Level 2 with CIE color characterizations.

Pantone has developed the Professional Color Toolkit, an extension that manages color look-up tables across applications and devices, provides device-independent CIE-to-RGB conversion for Pantone colors, and passes CIE data on to color-management systems.

Focoltone has taken a more passive approach, supplying color-management system developers with CIE references for all its colors.

These new technologies will provide a closer color match between display and desktop-printer output and will get you a step closer with offset press results.

Technology vs. inertia. Despite the unique features offered by each of the systems, it appears that Trumatch, Focoltone and Toyo may be no more than interesting theoretical diversions in a world totally dominated by Pantone. At best, their main role will probably be as color selectors for hues that will ultimately be matched on press by CMYK mixes — that is, until the world switches to full digital output.

"The digital color models like Trumatch are not meant for offset printers but for the color output devices to come," said Barrie Sosinsky, author of "Beyond the Desktop: Tools and Technology for Computer Publishing."

"A lot of service bureaus are seeing increased demand for color output, and digital printing is where these systems will come into their own." □

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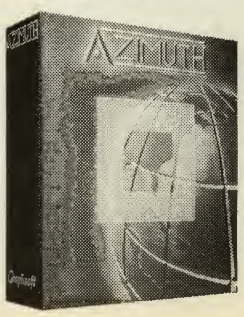
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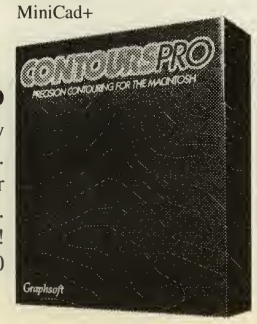
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New Media STEVE ROSENTHAL

Bailing out of down spiral

My prediction: CD-ROM technology as we know it won't last much longer as the preferred format for interactive multimedia applications. We'll still have optical media of the same general size that will be read back by laser beams. But new designs will likely change to include track formats and speed controls more like you find on a hard disk.

The main reason is speed. As sales of the AppleCD 300 and the Toshiba America Information Systems Inc. TXM-3401 demonstrate, faster is better when it comes to CD data playback. But even these drives aren't nearly fast enough for many digital video or interactive audio applications. You may have noticed that when Apple or third parties demonstrate their latest interactive efforts, they usually get their data from a hard disk.

The technology is already available to do much better. Compare a CD-ROM drive to the present generation of 3.5-inch removable-disk optical read-write drives. You'll see the 3.5-inch drives take about one-tenth as much time to move to a selected track on the disk, and they transfer data about five to 10 times as fast when they get there.

Admittedly, a CD-ROM holds more data. But if you compare the current generation of 256-Mbyte 3.5-inch drives with the 660 Mbytes on a 4.7-inch CD-ROM, you'll see you could do about as well with the basic 3.5-inch format by scaling up to CD size. Prices should also be close to equal if the media were created and used in equal volumes.

The basic problem with present CD designs is the spiral track format. Instead of the series of concentric rings used for the track pattern on a hard disk or floppy, a CD's "tracks" are just logical distinctions in a single groove that runs from inside of the disc to the outside.

> Finding a track position on a spiral disc is a slow process. Even if the drive can make a quick jump, you have to wait for the disc to change speed.

Furthermore, to keep a steady flow of data moving past the reading beam despite differences in the length of each turn of the spiral, a CD drive alters rotation speed to turn faster when reading the inner areas and slower for the longer outer turns. This technique produces a constant linear velocity (CLV), which should be a familiar feature to users of laser discs.

As a format for a stand-alone music playback device without any extra memory or buffering, this spiral track works quite well. It provides a continuous data stream from beginning to end with no gaps. Any speed changes within a selection are gradual, and if you jump between selections, the slight pause gives the drive enough time to alter the rotation speed.

But it doesn't provide optimal performance for computer playback of interactive data where a program is likely to request different items from the disc. Finding a track position on a spiral disc is a slow process. Even if the drive can make a quick jump, you have to wait for the disc to change speed. And if you speed up the disc for a faster transfer rate, the increased inertia makes it harder to adjust the speed.

But we don't have to give up entirely on the current formats. Just as the SuperDrive can read and write both the constant-rotation PC format and the Mac's CLV-like zoned format, it should be possible to build a drive that plays both existing CD-ROMs and a faster, more hard disklike format. With buffering on the drive and the intelligence in a SCSI interface, you could even provide a steady data stream while the drive skips to new tracks in the concentric-track format.

Right now, looking out at the market it may not look like CDs are in any danger. But do you remember how recently 5.5-inch drives were king? □

Send tips and comments to Steve Rosenthal, c/o MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105; AppleLink: Steve.R; MCI: 114-8611.

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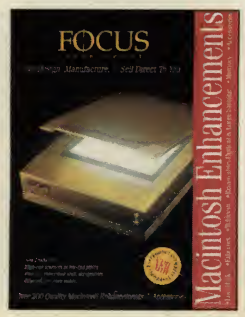
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Explore the intersection of art and technology in filmmaking with a panel of eminent motion picture and television directors such as James Cameron (*Terminator 2),* John Badham (*Point of No Return*) and Martha Coolidge (*Ramblin' Rose*).

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Discover how different it will be to live and work in a digital society. As information becomes commercial, you may be buying news that's now free on network TV from your favorite cable entertainment channel, and your telephone company may be selling you interactive shopping services.

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BUSINESS WATCH

- Industry news
- Market trends

Poor results prompt Radius reorganization

New CEO moves to reduce overhead

By Jon Swartz

San Jose, Calif. — It didn't take Chuck Berger long to make his mark at struggling Radius Inc.

Just one month after taking over as the company's third president and CEO in two years, Berger has overhauled top-level management in a move to streamline operations and jump-start sales. Last week's reorganization includes the elimination of three executive positions and the creation of two new posts.

"Our goal is to improve the implementation and execution of operations, sales and marketing," said Berger, a former executive at Apple and Claris Corp. who specialized in business development, operations and support. "We needed to restructure by taking out a layer of management and separating marketing functions."

Gone are Mary Coleman, vice president of marketing; Lloyd Fugate, senior vice president of field operations; and Steve Bartlett, vice president of operations. Fugate and Coleman were brought in last year by Barry James Folsom, who resigned as Radius CEO last fall after an 18-month tenure marred by disappointing sales and low morale.

Ed Colligan, director of marketing and sales for Radius' systems division, has been named vice president of product and strategic marketing. The new post of vice president of North American sales and marketing will be filled soon, according to Berger. In addition, Berger said he will appoint someone to head SkyLab, the company's forthcoming high-performance media server technology "as soon as possible."

Although Berger made it clear SkyLab will play a key role in the company's future business plans, he said Radius must "reconcentrate on products we lost focus on — monitors, graphic accelerators and video cards."

Industry observers said a muddled product strategy has hurt the company's bottom line.

Radius, based here, reported a 28 percent drop in sales to $30.9 million and a $7.9 million loss for its second quarter ended April 2 (see

See Radius, Page 58

Scitex invests in RasterOps

By Jon Swartz

Santa Clara, Calif. — Running low on cash after three straight quarters of poor earnings, RasterOps Corp. last week received a $10 million infusion from Scitex Corp. Ltd. in exchange for 13 percent of RasterOps' stock.

Under the preliminary agreement, Scitex will buy RasterOps stock for $8 per share, with an option to increase its total ownership to 19 percent at $9 per share. Scitex, an Israel-based giant in the color prepress systems market, is now RasterOps' single largest shareholder.

The agreement also calls for the companies to collaborate on distribution, technology and marketing.

More important, industry observers said the multimillion-dollar investment is crucial for the long-term financial stability of RasterOps. The peripherals maker's cash reserves have evaporated in the past nine months, from $16.8 million to just $3.4 million, according to RasterOps financial documents. □



JAMES ARONOVSKY

Steve Parrott, an employee of Sun Computers, found himself out of a job last week. A sign on the door says: "As of April 20th close of business day, Sun Computers will no longer operate from this location."

Sun finally sets on computer chain

By Ian G. Jacobs

Carson, Calif. — The sun apparently has set for the final time on Sun Computers Inc.

The 200-person Apple reseller, which has had financial problems for several months, recently suspended operations, according to sources.

Several of the company's customers, who asked not to be identified, claimed they saw guards remove furniture and padlock the doors of Sun's offices here last month.

Steve Parrott, a Sun employee since 1990, said workers were given one-hour notice last week before company officials locked the doors. "There were millions of rumors about [money] problems, but it still came as a shock," he said. "All the managers had quit earlier in the week. That's all I know."

Today, a curt message greets visitors to Sun's headquarters here: "As of April 20th close of business day, Sun Computers will no longer operate from this location." A phone number is given for more information, but it is disconnected.

Sun officials could not be reached for comment.

In an interview last month, Sun President and CEO David Sun said Sun's financial woes were temporary and there was little chance the company would be forced to file for bank-

See Sun, Page 58

Aldus Q1 earnings down but better than anticipated

By Eric Lach

Seattle — Aldus Corp. last week posted first-quarter financial results that were slightly higher than expected but well below corresponding figures for the same period last year.

For the quarter ended April 2, Aldus' revenues were $41.6 million, down 6 percent from $44.1 million in last year's first quarter. Earnings were $400,000, compared with $4.7 million a year ago. Aldus' stock fell $1 to $13.75 last week.

Officials said the company's poor year-to-year performance resulted from a slump in sales of current versions of Aldus PageMaker for Mac and Windows after the announcement of Version 5.0 in January. Aldus said then that the upgrade

See Aldus, Page 58

Symantec posts losses for Q4, year

By Jon Swartz

Cupertino, Calif. — Battered by declining sales of its DOS utilities and applications and besieged by legal questions over its executives' roles in a trade-secrets dispute, Symantec Corp. last week announced disappointing results.

The company, based here, reported lower sales and a loss for both its fiscal year 1993 and its fourth quarter ended April 2.

For the fiscal year, Symantec reported revenues of $206 million, down 6 percent from $219.2 million in fiscal year 1992. The company said it lost $5.7 million, compared with a profit of $34 million last year.

Fourth-quarter sales slid 19 percent to $51.3 million, from $63.2 million in the same period a year ago. Symantec lost $1.5 million during the quarter, compared with an $11.2 million profit last year.

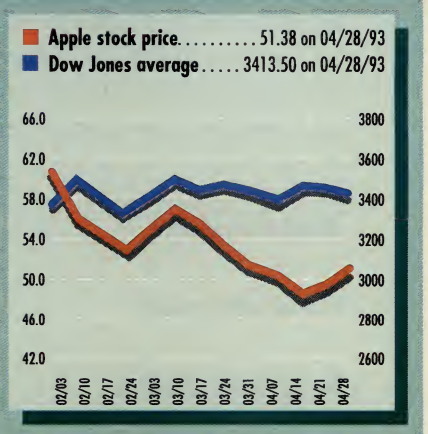
"This has been a difficult year," said Symantec CEO Gordon Eubanks, who, along with fellow executive Eugene Wang, was indicted in March by a California grand jury on charges of stealing documents from Borland International Inc. Symantec said it spent about $1 million in legal fees on the case during the past quarter.

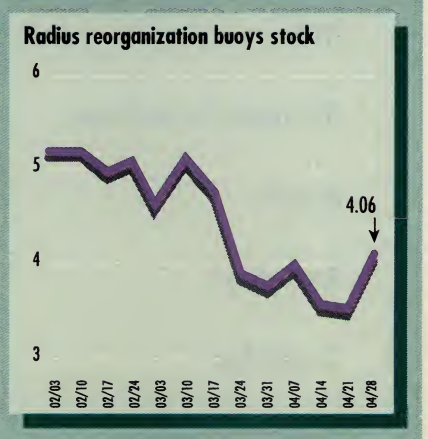
Symantec's annual results included a one-time charge of $12.1 million for acquisitions, restructuring costs and other nonrecurring charges. □

StockWatch

	04.28.93 CLOSE	WEEKLY % CHANGE
Apple	**51.38**	**3.53**
SOFTWARE DEVELOPERS		
Adobe	**55.00**	**18.28**
Aldus	**14.75**	**-7.81**
Caere	**7.50**	**0.00**
CE Software	**3.25**	**-5.47**
Microsoft	**86.00**	**1.33**
Novell	**30.13**	**-6.59**
Symantec	**12.63**	**-2.88**
PERIPHERALS VENDORS		
CMS	**2.38**	**-9.52**
HP	**73.00**	**-2.34**
Mass Micro	**0.44**	**39.94**
QMS	**15.13**	**-11.03**
Radius	**4.06**	**12.08**
RasterOps	**6.88**	**27.91**
Sigma	**5.38**	**-2.27**
SuperMac	**16.50**	**-7.04**
STORAGE		
Conner	**12.88**	**-1.90**
Maxtor	**6.63**	**-15.87**
Quantum	**13.63**	**3.81**
Seagate	**15.63**	**0.00**
SyQuest	**11.38**	**-5.21**
INDUSTRY INDICATORS		
DEC	**43.75**	**-1.41**
IBM	**50.00**	**1.52**
Motorola	**70.13**	**-2.77**
Sun	**25.88**	**-1.43**
Dow Jones	**3413.50**	**-0.75**

Compiled by Nordby International Inc.





In the throes of a nine-month slump punctuated by poor earnings and changes in management, Radius Inc. last week announced a major reorganization (see story, this page).

The executive overhaul, which affects Radius' operations and sales and marketing divisions, was viewed favorably on Wall Street. Radius stock rose 12 percent to $4.06 per share last week.

If the stories you've heard about Thunder/24™ led you to believe it's the fastest color graphics card, the results of a new, independent lab test will leave you thunderstruck.

In a Hydra QuickDraw™ performance test, Ingram Laboratories found PrecisionColor 24X™ was up to 19% faster.

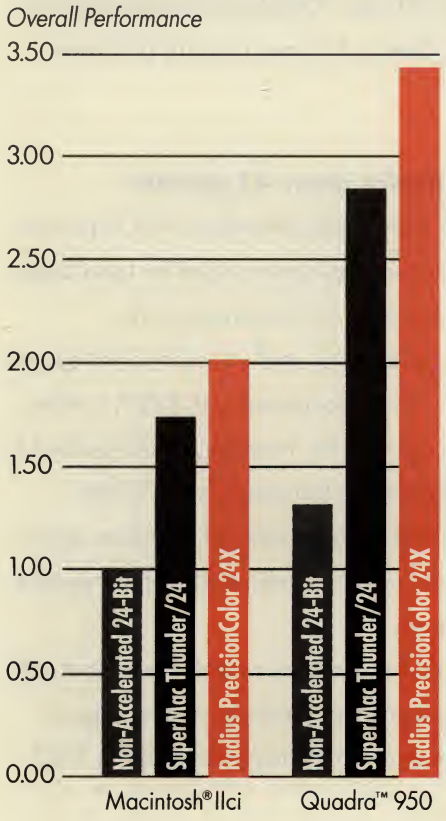
That's surprising, especially since the makers of Thunder/24 want you to pay $1,250 more for their card.

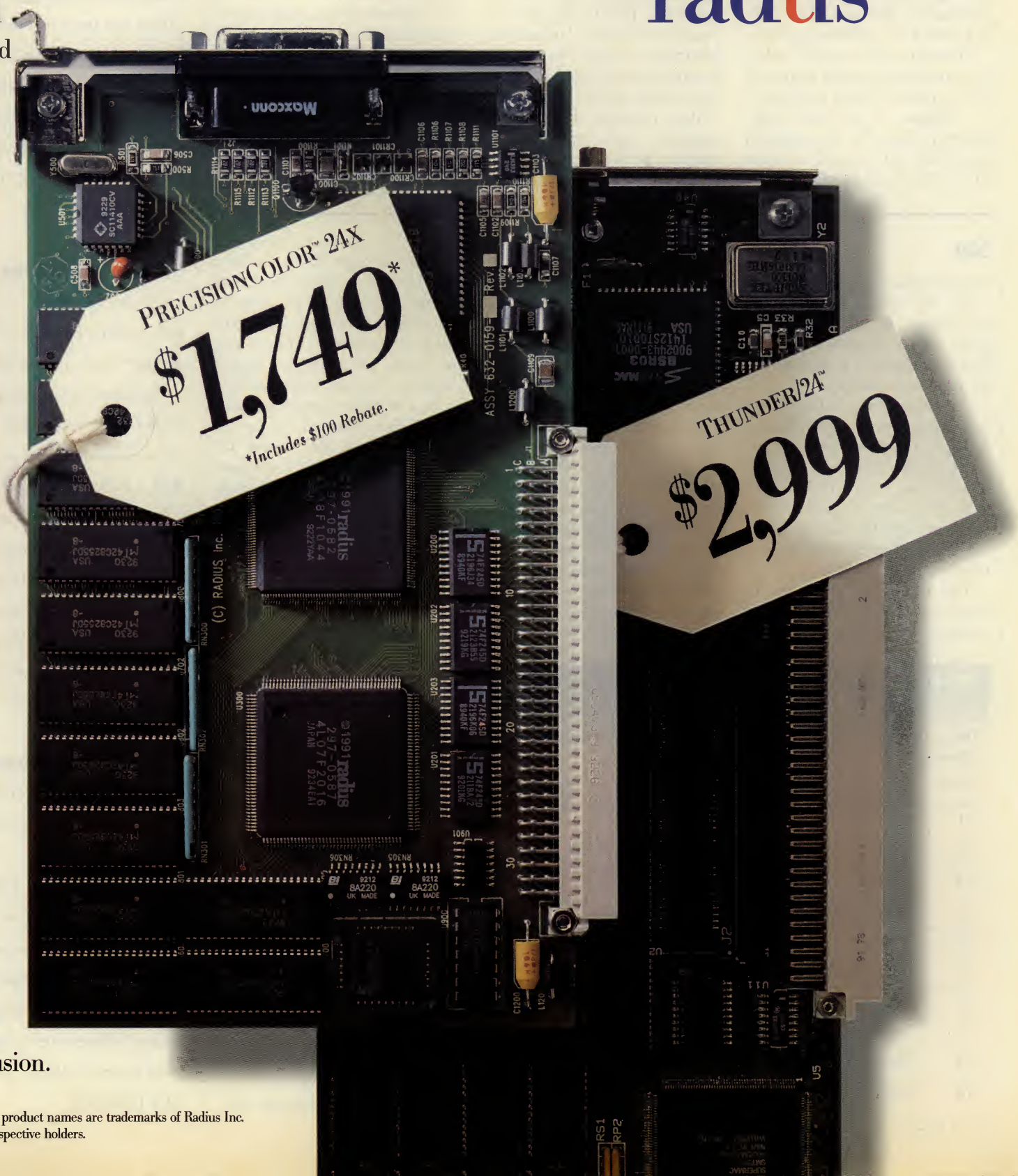
PrecisionColor 24X isn't just faster and less expensive. It's also available in 7" and 9" versions. So it will fit in all of Apple's newly-announced systems, as well as current models.

No wonder MacUser rated PrecisionColor 24X "Best Price/Performance." And both MacWorld and Byte named it their "Readers' Choice."

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Drive makers mix results

By Jon Swartz

San Francisco — Quantum Corp. and Maxtor Corp. last week reported strong fiscal years but drastically different results for their fourth quarters.

▶ **Quantum** of Milpitas, Calif., posted sharply increased sales and profits for fiscal year 1993 and its fourth quarter.

The company, fueled by a 20 percent surge in unit shipments of its 3.5-inch drives, said sales for the fiscal year ended March 31 jumped 51 percent to a record $1.7 billion, while profits doubled to $93.8 million.

Quarterly sales were a record $507 million, up 45 percent from $345 million in the same quarter a year ago. Fourth-quarter profits increased 52 percent to $26.3 million from $17.2 million a year ago.

Quantum said it was the industry's largest independent supplier of 3.5-inch drives during the quarter.

▶ **Maxtor** of San Jose, Calif., reported a sharp rise in annual sales and profits but recorded a loss of $19.7 million for its fourth quarter.

The company attributed the loss to overhead costs, a glut of 40- and 80-Mbyte drives in Maxtor's inventory, and an industrywide price war. As a result, Maxtor said last week it has eliminated 103 jobs, or about 10 percent of its San Jose work force. Maxtor employs 9,000 people worldwide.

Maxtor's 1993 profits rose to $46.1 million, an increase of 549 percent from $7.1 million in 1992. Sales increased 39 percent to $1.4 billion.

Maxtor's sales for its fourth quarter ended March 27 fell 10 percent to $345.6 million from $383.5 million a year ago, and it lost $19.7 million, compared with a profit of $18.6 million. The loss ended a string of five consecutive profitable quarters. □

Radius

From Page 56

MacWEEK, April 26). The company has posted lower-than-expected earnings in each of the past three quarters, and Berger predicted losses for Radius' next two quarters.

"We absolutely need to reduce overhead," Berger said. "We can't continue to have the big operating expenses we've had." He said every department except for product development and sales and marketing would be subject to cuts.

More troubling, the peripherals company's gross margins have dropped from 40 percent a year ago to just 22 percent for the recently completed quarter. SuperMac Technology Inc.'s recent quarterly margins were up, to 37 percent, while RasterOps Corp.'s slipped to 33 percent.

Berger blamed the decline in margins on several one-time charges during the past quarter and said he expects margins to bounce back to 30 percent by the end of the year. He said Radius remains sound financially, with $23 million in cash and no debt.

"To be successful, Radius must be as close to the customer as possible and take advantage of its core strengths," Berger said. To that end, Radius is expected to soon announce on-site service and support featuring 24-hour turnaround on repairs. □

Sun

From Page 56

ruptcy (see MacWEEK, April 19).

He did reveal, however, that Sun's money troubles deepened in January when it experienced cash-flow problems after participating in an Apple-sponsored promotion.

The Orange County (Calif.) Register last month reported that Sun attempted to switch creditors and ended up defaulting on a loan with Transamerica Commercial Finance Corp. of Chicago. Transamerica has since sued Sun. The case is pending.

David Sun last month declined to comment on the lawsuit.

The 13-year-old chain has 13 stores and posted fiscal year 1993 revenues of $106 million. □

Aldus

From Page 56

would be released on both platforms in the first half of 1993, with the Windows product coming out first, followed 30 days later by the Mac version.

The company last week refused to reconfirm the ship date for Mac PageMaker 5.0. "The Windows version of 5.0 is currently expected to ship in the latter part of the second quarter, followed by the Mac version approximately 30 days thereafter," according to a company statement. "However, there is always an element of risk in software development and the company will ship the product when it meets the standard of quality expected by its customers."

Scott W. McAdams, senior vice president at Ragen MacKenzie Inc., a Seattle-based investment bank, said: "I expect the Mac version to not be out until the third quarter. The Windows version appears to be coming out on the cusp of the June quarter, which puts the Mac version into Q3."

In a telephone interview, Aldus CEO Paul Brainerd vehemently denied that the Mac version had slipped. Brainerd said the company, which is currently fighting a shareholders' lawsuit, is merely being cautious. "I wouldn't read a whole lot into that," he said. "Our product teams are still showing ship dates ... in the second quarter."

Whether or not the Mac version is released by mid-year, both upgrades are now likely to ship so late that little upgrade revenue will be recorded in the current quarter. "A lot of people were expecting that the June quarter would benefit from some upgrade revenue from PageMaker 5.0," McAdams said. "Because all that revenue is being pushed back later in the year, the June quarter ends up being another break-even quarter, which is a little disappointing."

In response to the Aldus report, Mary G. Meeker, a vice president at Morgan Stanley & Co. in New York, lowered her second-quarter earnings estimates. Mary McCaffrey, an analyst at Alex. Brown & Sons in Baltimore, said she is predicting a loss in the second quarter.

International sales accounted for 52 percent of Aldus' total revenue for the first quarter, the company said. □

MacWEEK index
SALES PER EMPLOYEE

The top 10 software companies in sales per employee in 1992, according to Soft•letter.

RANK	COMPANY	1992	1991	% CHANGE
1	Adobe Systems Inc.	$295,479	$327,608	-10
2	Novell Inc.	$256,632	$201,790	27
3	Microsoft Corp.	$256,063	$227,500	13
4	Borland International Inc.	$237,060	$221,374	7
5	Autodesk Inc.	$234,965	$223,980	5
6	Lotus Development Corp.	$204,568	$191,698	7
7	Symantec Corp.	$203,590	$211,824	-4
8	Aldus Corp.	$174,131	$175,977	-1
9	Santa Cruz Operation Inc.	$145,277	$114,583	27
10	WordPerfect Corp.	$131,453	$183,874	-29

Source: Soft•letter.



Business BRIEFS

The latest Mac shortage: LC III

Cupertino, Calif. — Just when it looked as though Apple had finally caught up with demand for most of its Mac models, now comes word from dealers of a major LC III shortage.

"By the time we get our order, it will have been a month late," said Bert Cutler, president of Class One Inc. in Tempe, Ariz. "The LC III is easily our most popular model."

Demand snowballed over the past two weeks as dealers increased their LC III orders in hopes of getting a few, according to a buyer for a major distributor that represents 500 Mac resellers. "There has been an epidemic of overbooking," she said, adding that the LC III is Apple's top-selling product.

Despite the LC III shortage, most Macs are available now, according to dealers. They said the only other Macs still in short supply are the PowerBook 180 and 230-Mbyte configurations of the Mac IIvx, Centris 610, Centris 650 and Quadra 800 (see MacWEEK, April 19).

Lotus Q1 sales flat, profits down 41 percent

Cambridge, Mass. — A steep first-quarter drop in DOS product sales offset a boom in Windows applications sales for Lotus Development Corp., producing flat sales and declining profits.

The software company, based here, said sales for its first quarter ended April 3 were $227 million, compared with $227.1 million in the same quarter a year ago. Profits, however, fell 41 percent to $12.3 million from $20.8 million in last year's fourth quarter.

A company spokesman said although sales of Windows applications rose 100 percent during the quarter, a 42 percent decline in DOS sales nullified the gain.

Lotus CEO Jim Manzi said the company now derives about half of its revenues from Windows-related products, and he expects that figure to grow with the shipment of major upgrades to 1-2-3 for Windows and Notes.

American developers land on European soil

Dublin, Ireland — With some financial help from the Irish government, Iona Software Ltd. is bringing U.S. software to European Mac users.

Iona will initially distribute localized software in 10 countries, including Germany, the United Kingdom, France and eventually Japan. Available now are Dubl-Click Software Inc.'s ClickChange and After Hours Software's DateBook. Iona said it will distribute Microsoft Windows-compatible applications by the end of the year.

Iona Software Ltd. is at Unit 6, IDA Enterprise Centre, East Wall Road, Dublin 3, Ireland. Phone 353-1-366328; fax 353-1-366268.

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BPA

EDITORIAL

Intel a shaky platform for Mac

Do large numbers of users of Intel-based computers really want an alternative to Windows? And can Apple, even with the help of Novell Inc., convince those who do to choose the combination of DR DOS and a ported version of the Mac Finder and Toolbox, in preference to OS/2, Windows NT, Solaris or NeXTstep?

The success of Apple's plan to bring the Mac look and feel to the microcomputer mainstream hangs on the answers to these questions.

If the answers are "yes," the company, its developers and its current customers stand to reap huge rewards: for Apple, a share of the high-margin operating system revenue that now streams into Bill Gates' coffers; for Mac developers, a vastly expanded potential market (assuming they can port their applications without undue difficulty); for users and managers already committed to the Mac environment, an increasing flow of innovative applications and an enormous array of new hardware options, many of them at prices well below Apple's.

But how realistic are the assumptions on which this scenario rests? Had Apple made this move years ago, before Windows 3 became a de facto standard and the other, higher-powered OS alternatives had emerged, it would have had a fighting chance. But in 1993, we suspect, a stripped-down version of System 7 will be too little, too late to put the brakes on Windows' momentum.

Besides, we can't help but wonder whether Apple, which has had trouble enough producing stable software on schedule for its own hardware, will be able to master the diverse universe of Intel-based systems — especially at the same time as it struggles to move its OS to yet another platform (the PowerPC), deliver its long-promised extensions, integrate the contributions of Taligent Inc. and Kaleida Labs Inc., and branch out into a variety of new businesses.

If Apple isn't careful, hubris could bring disaster. The risk isn't just that the Intel venture could fail but that the diversion of management attention and engineering talent could put its core business in jeopardy. □

Commentary

ISDN: It may be coming to a desktop near you


JEAN-LOUIS GASSÉE

A $70 installation and $20 to $30 per month is about all you need to order an ISDN line from Pacific Bell and other regional Bell operating companies. That's it, no kidding. ISDN is here.

Well, almost. We now have the network, but most everything else is missing for personal computer users to explicitly use the digital telephone network.

The Fry's factor. In the words of one of my colleagues, if it's not at Fry's it doesn't exist. (Fry's Electronics is a California chain of stores and well-known watering hole for techies and techie wannabes.)

High-speed modems can now be had for about $200, Ethernet adapters for $150, and that store, always carefully watching its customers, now stocks fiber-optics paraphernalia but no ISDN (Integrated Services Digital Network) adapters. So, in everyday terms, ISDN still stands for "I still don't know."

Our local supplier, Pacific Bell, has made all the investments and honorably kept its commitment to deliver ISDN in California by April 1993. Unfortunately, for all its good work, Pacific Bell still seems incapable of relating to the people who will help make ISDN as ubiquitous as modems are today.

True, the ISDN pioneers have been limited to high-volume business users. But for ISDN to become "real" it must be accepted (and purchased) by individuals.

Count the number of personal computers shipping this year. The numbers are in the tens of millions. Ultimately, there is no reason for these machines not to be connected to the digital telephone network.

That's where the big numbers are and Pacific Bell must know it. After all, the company is used to making money one quarter at a time.

Pacific Bell's latest literature details the various ISDN options. But the language will discourage most computer users who have enough trouble as it is with system extensions or WIN.INI files. There is no evidence of an effort to inform, let alone seduce, personal computer users. Having spent billions updating the network, the company could work harder helping future revenue generators understand how to connect.

This could be money better spent than promoting a premium service of customized sports, business and general news on their voice mail. As if listening to long-winded messages isn't torture enough, now we may be confronted with a voice-mail version of CNN Headline News.

But there are other obstacles. For example, the few commercially available ISDN adapters are priced between five and 10 times the cost of a modem or an Ethernet adapter. Now that the network is in place, this is likely to change.

Fun in SOHO. As everything falls into place, a number of applications will benefit or emerge from ISDN. They range from Bell Labs' favorite, desktop videoconferencing and screen sharing, to improved access to on-line services and SOHO (small office home office).

In SOHO applications, ISDN can perform very nice "LAN on draft" tricks. Programmers and MBAs alike can connect their home machine to the mother LAN, download the latest code or presentation slides, and disconnect. Only, it happens about 10 times faster than regular phone lines.

With so many compelling uses, with silicon ready to do for ISDN what it did for modems and Ethernet, and with the network now in place, there is finally hope that our favorite stores will have an ISDN section, making it real at last. □

LETTERS



Cracked PowerBook display leaves hole where cash was

This story about the dark side of the notebook experience begins with my purchase of a treasured PowerBook Duo 230.

My Duo rewarded my affectionate reverence one day by developing a crack down the center of its display. Apple said the crack was my fault but pledged to repair it for a mere $1,090, almost half of the Duo's original cost.

I did not "misuse" my Duo, as Apple alleges, trying to avoid paying for the repair; it was not dropped or mistreated, and I kept it in a protective case whenever it was not in use. When I expressed the opinion that a notebook computer should have a certain degree of durability, the Apple technician reminded me that computers are fragile and tried to make me feel guilty for ever taking the machine from my desk. This is odd, since when I bought it I had the distinct impression that it was portable.

I am disgusted and feel betrayed by Apple. I was never warned how fragile it is nor how expensive it is to fix. I have no idea what caused the damage, and I have no idea how to prevent a new screen from cracking.

Therefore, I suggest that everyone think twice before plunking down $2,500 for one of these sexy machines.

Nathaniel Levine, Davis, Calif.

This plague of sticky mice is everyone's problem

Ric Ford's MacInTouch column (MacWEEK, March 15) about mice that occasionally ignore a button release described a problem that has plagued me for a long time.

When I called Apple's Customer Assistance Center about my defective, out-of-warranty Malaysian-manufactured mouse, I got a case number and a promise to replace the mouse.

Three weeks later, I called back to inquire about my new mouse. I was told that the serial number of my mouse is not within the undisclosed range Apple is willing to replace. Nor has Apple provided any explanation for this problem that might guide in-house repair efforts.

I ask MacWEEK readers to talk to friends and co-workers about this problem. Network managers and user group leaders could be especially helpful in polling their organizations. The details, including serial numbers, of mice found to have defective buttons should be registered with Apple's Customer Assistance Center at (800) 776-2333. If enough of us register a complaint, Apple will be forced to address this plague of defective mice. If we allow Apple to maintain its disdain, we can hardly expect it to provide support when the next, potentially more serious Mac defect is uncovered.

Bill Sloan, programmer, writer and trainer
Amherst, Mass.

UserLand Frontier, AppleScript aren't either-or proposition

Thanks for Steve Michel's Script Manager column "How will AppleScript release affect the future of Frontier?" (MacWEEK, April 19).

It's always hard to scope out these new categories while they're still new. But here's my take: I don't think it's an either-or deal. I think people who are going to do development work using applications as toolboxes will have both products. It's like Macintosh Programmer's Workshop vs. Think, a conflict that has settled down to the point where people who write software for the Mac usually have both. They're useful for different things. It would have been difficult to figure this out in 1986, when MPW vs. Think was a hot topic in the Mac world.

We think Frontier's integrated tools (object database, full script debugger, complete set of built-in system-oriented verbs) and C-like syntax will appeal to people who currently use or have used BASIC, Pascal, C, C++, ACI US Inc.'s 4th Dimension, dBASE, Microsoft Excel or Lotus 1-2-3 macros, DOS batch language, or Unix shell language. We very consciously designed Frontier so that the transition would be smooth for people with experience using these earlier development tools.

Because of AppleScript's style of syntax and level of integration with HyperCard, we believe it will appeal to HyperTalk users. They have always been a fairly distinct group within the Mac community, probably owing to Apple's early positioning of HyperCard as a tool that end users can use to write their own programs. "Real" developers weren't very impressed. But HyperCard did gain a very substantial following. This is Apple's natural turf.

We believe in system-level scripting and would rather see people use AppleScript than not have system-level scripting be a major force in the evolution of the Mac. AppleScript is a good thing for Frontier because it encourages a new way of thinking about applications, for both users and developers. In the same way, Frontier is a good thing for users and developers because it encourages Apple to view system-level scripting as a competitive market, rather than a captive market.

Those who want more information can download our Reviewer's Guide for System-Level Scripting from the UserLand forum on CompuServe. Enter GO USERLAND at any prompt. It's called GUIDE.SIT and is in Library 8.

Dave Winer, president
UserLand Software Inc.
Redwood City, Calif.

Send letters to MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105. MCI 323-1203; Internet, letters@macweek.ziff.com; fax (415) 243-3650. Include your name, address and phone number. Letters should not exceed 300 words. We reserve the right to edit for clarity and length.

The Mac Manager

How right is rightsizing? The answer is up to you



DON CRABB

Rightsizing is a cause célèbre these days in corporate computing. Simply put, it means replacing mainframe-based 3270 and VAX terminal networks with client-server applications on networks of workstations, IBM PCs and compatibles, and Macs.

It has been the focus of hundreds of articles in publications such as BusinessWeek, InfoWorld, The New York Times and, I suspect, Highlights for Children. It's the No. 1 strategic topic among information-systems managers and is likely to remain so for years to come.

It makes Mac managers nervous for three reasons:

- Consultants can't always give you a tight and fully accurate financial rightsizing migration plan. Mac managers worry that their already overworked Macs and servers and networks will be asked to take on more without increasing their capacity.
- Rightsizing has become mythic at reducing operating costs, and Mac managers don't usually like mythology at the office.
- Some vendors and too many press stories these days talk about rightsizing as if it were the computer version of being environmentally aware.

The first concern can be addressed by pushing hard enough to nail down the fixed costs of migrating while making sure network and server capacities can grow to meet the new challenge. The second can be handled with enough cost modeling to reveal the truth or fiction of perceived operational savings. But the third condition is perceptual and much tougher to evaluate rationally. After all, who wants to use mainframes when they represent the old wasteful computing ways, while client-server Mac networks show respect for our environment by using resources and people better?

How right is rightsizing? I visited the IS shops of two large and two midsize companies now considering rightsizing. Each company currently runs either standard 3270 mainframe networks with some Macs and PCs, or DEC VAX networks with Macs.

Not a single manager at these companies thinks rightsizing is a bad idea, but several think it is overhyped by the press and by vendors desperate for market legitimation.

All fret that upper management believes the hype that rightsizing always saves money and resources and always empowers employees better than mainframe systems.

Reality check. Timing, of course, is everything. For two of these companies, now is absolutely, positively not the time to rightsize. Even if the technical problems can be zapped with the wave of a wand, the strategic issues just can't be ignored.

With market pressures driving their businesses to be more and more productive and with a tremendous strain already placed on their data systems to provide critical market and sales information, now is not the time to risk IS disruptions — rosy futures made possible by rightsizing notwithstanding. The bottom line is that if you manage a mainframe-based data system you will eventually migrate it to a client-server system where Macs can play the critical desktop role. But as you do so, remember to turn on your cow pie detector.

It's up to you to sort out the realities of rightsizing in your shop, including how much it will cost, how long it should take and how much more environmentally sound your operation will really be. □

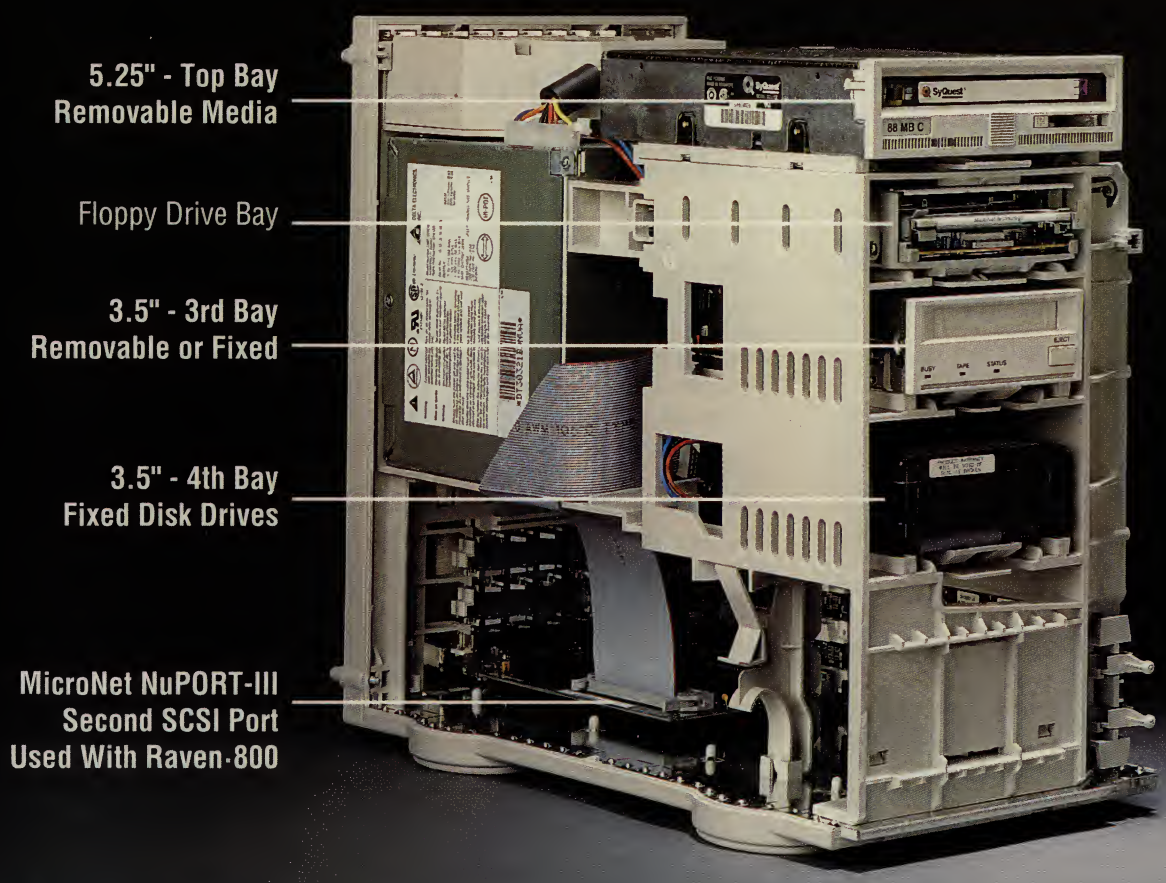
Apple broadens its market share with Makeup Macs



The Scentris *The Perfuma* *A Compact Disc Compact* *Newtone: pen-based eyeliner kit*

Disk Array Power!

Performance Matched With Apple Workgroup Server 80





Raven·800
Two Drive Disk Array

MicroNet's Raven·800. Disk Array Power For The Quadra 800.

MicroNet is the first to bring disk array power to the Quadra 800. With a matched pair of fast spindle drives, the Raven·800 delivers up to 9.2 MB/second sustained transfers with access time as fast as 4 ms.

Disk arrays can improve performance up to 400 percent over standard drives. Combine MicroNet's Raven·800 disk array with the speed of the Quadra 800 and you have an unbeatable system for applications such as PhotoShop, fileservers, and full rate digital video and audio recording.

Cost effective two drive disk arrays are available in capacities of 1030 to 5560 MBytes and are expandable to more than 38 GBytes. MicroNet also offers single disk drive systems that can be upgraded to a Raven·800 disk array at a later date.



Built on award winning technology, the Raven·800 takes full advantage of Apple's existing hardware. One drive connects to the native SCSI port of the Quadra, and one connects to a MicroNet NuPORT-III, SCSI-2 host adapter. Together, these two drives create a fast, parallel, 16-bit data path.

MicroNet has designed a complete family of internal storage systems for the Quadra 800. Included are SyQuest removable systems, rewritable optical drives, and DAT backup systems. All are shipped complete with custom designed bezels.

To put high performance disk array power in your Quadra 800, call MicroNet's Sales Department for configuration assistance or the name of your nearest Reseller. 1-714-581-1540.

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- Tempo II Plus. See Page 64.
- Reviews Forum. See Page 65.
- General MIDI sound modules. See Page 68.

Latest LaserJet is a PostScript power

Hewlett-Packard's new printer has the speed and strength to satisfy most heavy printing needs.

By Rick LePage

Hewlett-Packard Co.'s LaserJet 4Si MX represents HP's latest assault on the PostScript printer market. Designed for networks with medium to heavy printing needs, the 4Si MX replaces the aged LaserJet IIIsi and competes directly with similar network printers, such as Compaq Computer Corp.'s Pagemarq 15 and 20 and Dataproducts Corp.'s LZR 1560 (see MacWEEK, Dec. 14, 1992). We tested the printer in our offices and at Ziff-Davis Labs in Foster City, Calif., to gauge HP's success.

The 4Si MX, priced at $5,499, is based on a 17-page-per-minute, 600-dpi Canon print engine powered by a 25-MHz Intel Corp. 80960CF RISC processor. It ships with 10 Mbytes of RAM and can accommodate up to 26 Mbytes. Built into the printer are Adobe PostScript Level 2 and Enhanced PCL 5 support. It prints on letter-size paper only — unlike the LZR 1560 and the Pagemarq series, which can print on tabloid-size paper — and contains two 500-sheet paper trays (an envelope feeder; a duplex option; and additional, higher-capacity input trays are optional).

The printer weighs 106 pounds, so you'll want to make sure you have a location in mind before you unpack it. We found its operation very quiet, even when it was constantly printing jobs, so it conceivably could be placed in an inhabited office instead of banished to its own room.

Network ease. What sets the 4Si MX apart from its predecessor is its integration with multiple protocols and network media. The IIIsi required that you purchase separate interface cards for each network medium you wished to use. Out of the box, the 4Si MX includes a LocalTalk interface and a high-speed Bi-Tronics parallel interface, as well as an HP JetDirect Card for Ethernet that supports AppleTalk, Novell NetWare, Microsoft Corp.'s LAN Manager, IBM Corp.'s LAN Server and a number of other network operating systems. Unlike other Ethernet-based printers we have used, HP's solution truly is plug-and-play — we unpacked the printer, plugged it into our network and were printing within minutes.

Like many PostScript printers on the market today, the 4Si MX offers multiple interface switching, letting you print from different interface connections and between PCL 5 and PostScript without having to configure the printer in any special manner. In our testing, we were able to print concurrently from multiple connections with ease and even were able to print a PostScript job from a LocalTalk-based Mac, a PCL job from a DOS machine and a PostScript job from an EtherTalk-based Mac without losing the downloaded PostScript fonts in the printer's RAM.

General setup. On par with the ease of network installation is the printer's general setup. Although it is bulky and has a wide array of options, the LaserJet 4Si MX sets up easily. HP includes seven manuals and related documentation, including a Quick Reference Guide that helps you get everything hooked up. The printer has an LCD panel and a keypad to set all of the printer's hardware options, although most of these can be changed from your Mac or IBM PC or compatible as well.

The software, which for the Mac consists of a Chooser-level print driver, is installed through Apple's Installer program. (You can print to the 4Si MX using Apple's LaserWriter driver, but you won't be able to change any of the printer's options from your Mac.) In a gesture that we would like to see more printer manufacturers emulate, HP includes a PostScript Printer Description file to use with Aldus PageMaker, although we had problems with the one HP shipped us during our testing (an improved version has subsequently been made available).

When you print with the 4Si MX driver, you can specify the source tray, the setting of HP's Resolution Enhancement Technology (RET) and turn on the duplex feature (if the duplexing attachment is installed).

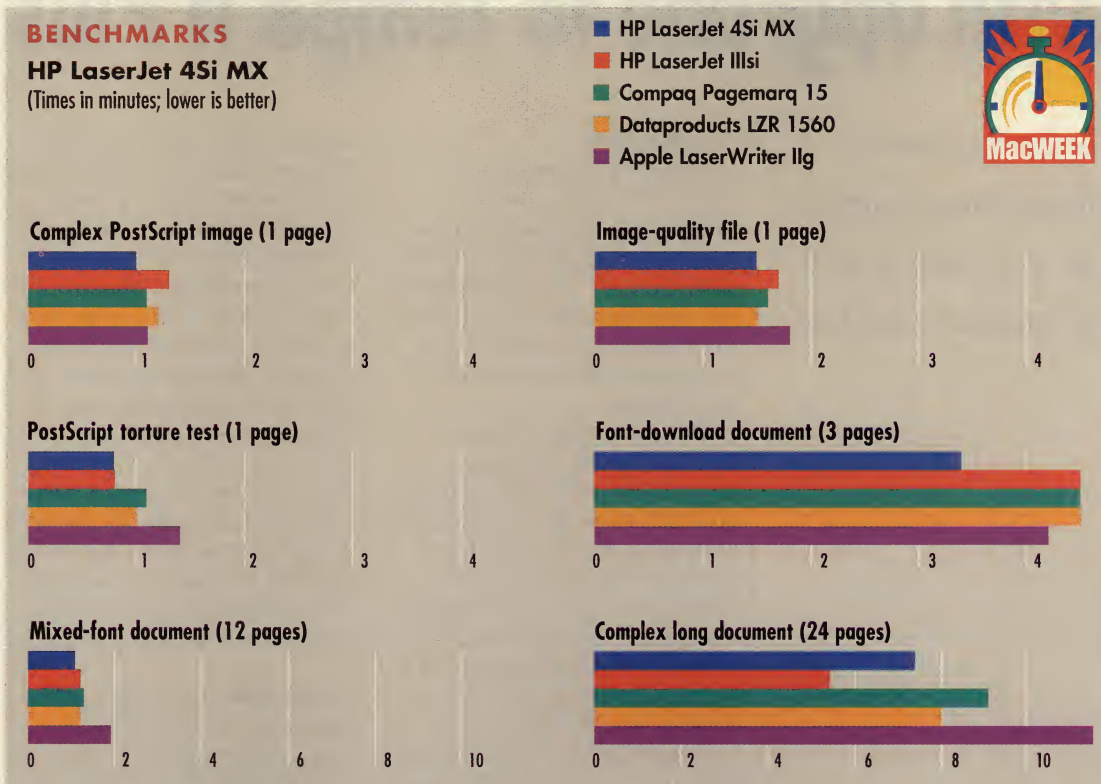
You can have the first page of a job print from one tray and subsequent pages from another. This is not as flexible as the driver extensions provided by Dataproducts and Compaq, which let you do things such as print the odd pages of a job from one tray and the even pages from another, but it at least

See LaserJet, Page 65

BENCHMARKS

HP LaserJet 4Si MX

(Times in minutes; lower is better)



Tests were performed on the respective printers under System 7.0.1 with Tune-Up installed, on a Mac IIci with 8 Mbytes of RAM, an 80-Mbyte hard disk and an Apple Mac IIci Cache Card. The complex PostScript, image quality and PostScript torture tests were run from Adobe Illustrator 3.2 and look at general PostScript processing. The downloadable fonts and mixed-font tests were run from Microsoft Word 5.0 and look at printer memory management, font rendering and engine speed. The complex long document test was run from Aldus PageMaker 4.2a and tests general performance and acquisition and processing of large amounts of data. Numbers for the LaserWriter IIg are included as a reference point.

score card

LaserJet 4Si MX

Hewlett-Packard Co.
List price: $5,499
Overall value ◆◆◆◆

HP has come up with a much-improved successor to the LaserJet IIIsi and a printer that more than holds its own against the competition in the network printer market. While it doesn't have many of the bells and whistles of printers such as Compaq Computer Corp.'s Pagemarq series, the 4Si MX does feature excellent performance; plug-and-play support for multiple network media and protocols; and top-quality, true 600-dpi output — all of which help it outshine its competitors. The LaserJet 4Si MX doesn't print on tabloid-size paper or offer frills such as SCSI disk or fax options, but as a solid, well-made network workhorse, the 4Si MX is our printer of choice.

Performance ◆◆◆◆◆
Features ◆◆◆◆
Configuration ◆◆◆◆
Compatibility ◆◆◆◆◆
Documentation/support ◆◆◆◆

RATINGS KEY

◆◆◆◆◆ *Excellent*
◆◆◆◆ *Very good*
◆◆◆ *Good*
◆◆ *Fair*
◆ *Unsatisfactory*

Minor mechanical problem solved

As this review was being prepared, Hewlett-Packard Co. announced moves to head off a potential mechanical problem in its first crop of LaserJet 4Si printers.

The company said it discovered the flaw, which may cause the laser printer's scanner assembly to break, in a small number of LaserJet 4Si models during routine stress testing. The problem appeared in both the Mac-compatible LaserJet 4Si MX and the version for IBM PCs and compatibles; HP introduced both configurations of the 17-page-per-minute network laser printer last month (see MacWEEK, April 5).

HP estimated that less than 3,000 of the questionable models were shipped to customers and said users had reported no problems with the scanner assembly.

Owners of the printer can have the component replaced free on-site, but HP said that most of the printers in question never left dealers' shelves. The company, which is working with dealers to repair the affected printers that were sold, said most of the units should have been fixed by press time. If you think you may have one of the printers in question, call HP at (800) 752-0900.

— By Matthew Rothenberg

Macro market branches out with upgrade to Tempo II Plus

The latest version of Affinity's macro software steps up to compete with CE Software's QuicKeys.

By Steve Michel

Despite all the numbers in Tempo's new title, Affinity Microsystems Ltd. has been relatively slow to update its venerable macro program. Two years after its last upgrade comes Tempo II Plus 3.0, boasting a new macro editor, many enhanced features and System 7 support.

The new version of Tempo, at $179.95, is as easy to access as always: When you open an application, the Tempo menu automatically appears at the right end of the menu bar. We prefer having the menu appear in this format instead of the hierarchical Apple menu item offered by Tempo's leading competitor, CE Software Inc.'s QuicKeys (see MacWEEK, Feb. 22).

Tempo II Plus 3.0 has expanded ways to play macros. Besides using Tempo's main menu, you can now place a Macro menu in the open application's menu bar and run either universal or application-specific Tempo macros from there. A new keyboard shortcut — the Play by Name dialog — lets you run a macro by typing the first few letters of its name. Tempo II Plus 3.0 offers several automatic ways to play a macro as well.

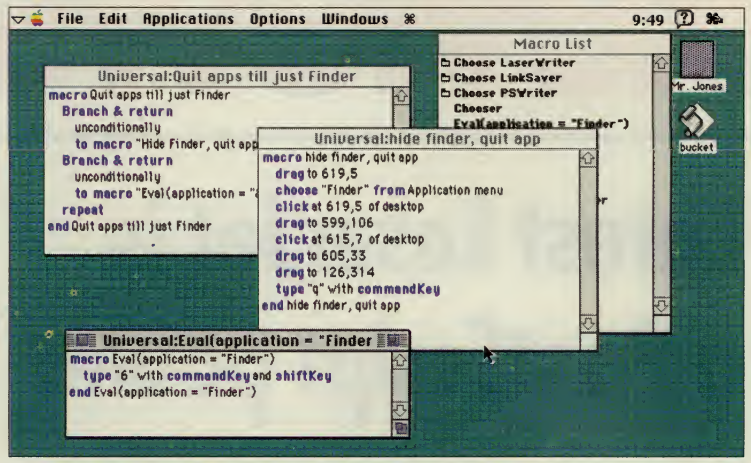
Recording session. As is the case with QuicKeys, the primary way to create macros is to record them. While Tempo II Plus 3.0 records a macro, it replaces its menu's Command-key symbol with an "R" as a reminder.

Recording offers a number of options, such as Smart Recording, launching other applications and branching to other macros. When Smart Recording is on, Tempo records dialog button clicks and menu selections by name rather than by position or number. We could not create a macro to Hide Others in the System 7 Applications menu, however.

Tempo's powerful branching capabilities really distinguish it from QuicKeys' approach. Macros can call other macros, and Tempo can decide which macro to call based on such things as the selected text, the name of the window and even bit maps of portions of the screen. You can assign values to variables — such as the name of the front-most application, or the time or date — and macros can branch based on those variables.

For the most part, editing macros is fairly easy: You can use tools provided on the Tempo menu or use the new Tempo Viewer. This separate editor is a useful tool for editing macros and copying them between application environments. In both editors, most of the macros are described, step by step, in English. For example, a macro to "Choose New from File menu" lists all the steps: Select File menu, select New and so on. We wish there were a way to create a macro in the editor; with the exception of Tempo external macros, all macros must first be created by recording, even if you simply turn recording on and then immediately turn it off.

Externals. Like QuicKeys' Extensions, Tempo II Plus 3.0 comes with externals that add power to the program. Nearly 50 Tempo externals let you do such things as copy files, send Apple events and display dialog boxes. While Tempo's externals are useful, they're also cumbersome. When Tempo calls an external, it simply posts a call to an Fkey located in the System file and tells the Fkey which external to use. When played back, this results in a context switch that causes the menu bar to redraw.



These windows show the "programs" for several Tempo macros. While the macros' syntax is fairly easy to understand, many users will want to avoid manually tweaking them.

Externals can take several parameters, which get enclosed in parentheses; these are included in the external's name, which can get pretty bulky. For example, the name of an external that displays a dialog box that can either zoom or close the top window might read: Button (Do this to top window; Resize=Zoom, Go Away/G=Close). Oddly, to edit an external, you have to rename it instead of simply choosing Edit.

Since each call to an external is a separate macro, a complicated macro becomes a sequence of calls to several other macros, each of which must be created separately. Some operations using externals actually require using two or more of them. For example, an external that sends an Apple event requires separate macros for setting the name of the application to which you want to send the event, for the event itself and for the value returned by the event. While this is easy to get used to, it does mean that the list of macros quickly becomes long and fairly unwieldy.

Apple events. Tempo II Plus 3.0 can send and receive Apple events but is limited in its support of them. It supports only the dosc (Do Script) event, which tells another program to perform a script.

A lot of programs, such as Claris Corp.'s HyperCard and FileMaker Pro, Microsoft Excel, and Aldus PageMaker, support this event. However, other programs that could make good use of Tempo, such as Portfolio Software Inc.'s Dynodex, do not support the Do Script event.

Documentation and support. Tempo II Plus 3.0's manual is ade-

See Tempo, Page 66

score card

Tempo II Plus

Affinity Microsystems Ltd.
Version tested: 3.0
List price: $179.95*
Overall value ◆◆◆

Tempo II Plus is a significant upgrade to the granddaddy of Mac macro programs. Key features include a variety of externals, sophisticated branching between macros, an easy-to-use environment and fairly minimal RAM requirements. Tempo does not offer many of the built-in utilities of CE Software Inc.'s QuicKeys, however, and many tasks that are easy to accomplish using that product take more work with Tempo. But if you need the branching feature, Tempo II Plus is a very good buy.

Performance ◆◆◆◆
Features ◆◆◆
Ease of use ◆◆◆◆
Documentation/support ◆◆◆

** Upgrades, $30 for Tempo II Plus users, $49 for Tempo II users, $79 for Tempo 1.x users.*

Quick-paced competition from CE Software

For many common tasks, we found Affinity Microsystems Ltd.'s Tempo II Plus 3.0 as capable as CE Software Inc.'s QuicKeys 2.1.3. But we couldn't perform some basic things, such as open folders with a keystroke; instead, we had to place an alias for the folder into the Apple menu and record a macro that selected it there.

And Tempo II Plus 3.0 isn't as adept at performing window-relative commands as QuicKeys. For example, it's easy in QuicKeys to record a macro that drags from the top left corner of a window to the bottom right corner. (This is useful for cropping graphics to a window in Adobe Photoshop or other graphics programs, or selecting all the graphic objects in a window.) But Tempo doesn't let you do this: It records the entire rectangle you draw, and when you play back the macro using a different window size, you don't get the same results.

A number of tasks that are useful to turn into macros — for example, turning file sharing off and on, selecting printers or other Chooser devices — are not supported directly by Tempo II Plus 3.0 or its externals. QuicKeys includes specific externals for these functions, making them easy to record and edit.

With Tempo, for example, to change to a specific printer, you need to record a universal macro that opens the Chooser, then record a Chooser-specific macro that selects a specific printer.

This is much more work than calling an external that bypasses the Chooser altogether, as you can with QuicKeys. In the same vein, Tempo II Plus 3.0 offers no counterparts to QuicKeys' ancillary utilities such as QKIcons and Instant QuicKeys.

Tempo II Plus 3.0 requires about 200 Kbytes less RAM than QuicKeys, which might make it more useful for those working on low-memory Mac models.

Externals aside, Tempo II Plus 3.0's interface is somewhat less Byzantine than QuicKeys' — for instance, there are not as many dialogs in the former — and Tempo doesn't require so many other supporting programs, which is another point in Tempo II Plus' favor.

CE Software Inc. is at P.O. Box 65580, 1801 Industrial Circle, West Des Moines, Iowa 50265. Phone (515) 224-1995; fax (515) 224-4534. — By Steve Michel

score card

QuicKeys

CE Software Inc.
Version tested: 2.1.3
List price: $149*
Overall value ◆◆◆◆

Performance ◆◆◆◆
Features ◆◆◆◆
Ease of use ◆◆◆
Documentation/support ◆◆◆◆

** Upgrades, $10 (free if purchased after Sept. 1., 1992).*
Reprinted from MacWEEK, Feb. 22.

LaserJet

From Page 63

covers the most common situation.

In addition to the Mac disks, HP includes setup disks and drivers for Novell NetWare, Microsoft Windows and a number of PCL drivers for mainstream PC applications.

Print quality. Like the LaserJet 4M, which was released last fall (see MacWEEK, Oct. 26, 1992), the LaserJet 4Si MX is a true 600-dpi printer that produces rich blacks, clean type and crisp graphics. Pattern fills and gray-scale images printed on the 4Si MX don't equal those printed on an Apple LaserWriter Pro 630 with PhotoGrade enabled, but they do come close.

When comparing output from the 4Si MX with that from a Compaq Pagemarq 15, which has a true resolution of 400 dpi and a maximum interpolated resolution of 800 dpi, the 4Si MX wins hands down,

> HP has done an excellent job of easing the problems of connectivity and improving both performance and output quality.

especially when printing type.

Unlike PhotoGrade, which can be used only when printing at 300 dpi, HP's RET can be used when printing at 600 dpi to boost the quality of type and line art. The improvement isn't as dramatic as using RET at 300 dpi, but it helps solidify HP's stature at the high end of the resolution scale.

Performance. The performance of the 4Si MX was stunning. In almost every test we ran, the 4Si MX outperformed the Compaq and Dataproducts printers, as well as the LaserJet IIIsi. The IIIsi, which excels at bit-map type images, was faster than all of our test printers in our long-document test (which consisted of a large number of bit-mapped images), but the 4Si MX was the winner in all other major areas.

Although much of the printer's speed can be attributed to its 25-MHz processor, another reason for the speed is a special page buffer HP engineers implemented in the printer, which allows it to format one page in the buffer while another page is printing. As a result, almost everyone who printed on the test unit remarked upon the 4Si MX's speed, especially in printing the initial page of a job.

Conclusions. When we looked at network printers last December, HP's LaserJet IIIsi was the most lackluster performer of the group, and we remarked that it was time for HP to make a move to stay competitive in the workgroup market. The LaserJet 4Si MX is more than just a catch-up play by HP, however. The company has done an excellent job of easing the problems of network connectivity and improving performance and output quality.

The 4Si MX is pricier than the Pagemarq and the LZR 1560 and does not have those printers' tabloid-size output capabilities. But when you consider HP's deep discounts and the additional configuration costs necessary for the other manufacturers' printers, we think the price difference pales in significance.

The 4Si MX's other limitations are few: It doesn't offer a SCSI option for connecting hard disks to the printer, it doesn't have a fax send-and-receive option (which Compaq offers with the Pagemarq series), and the driver could be more flexible when printing from multiple trays. These shortcomings are minor, however, when compared with the overall speed and utility of the 4Si MX. For networks with printing needs that go beyond the ubiquitous 8-ppm printer, the LaserJet 4Si MX is a nearly ideal solution.

Hewlett-Packard Co. is at 19310 Pruneridge Ave., Cupertino, Calif. 95014. Phone (800) 752-0900. □

At ZD Labs, Michael Clasen was the project leader for this report. Nat Poor and Blake Roberts were the technical specialists.

What makes the LaserJet 4Si MX different?

The LaserJet 4Si MX is an enhanced version of the $3,749 LaserJet 4Si, which shipped simultaneously with the 4Si MX. The 4Si is aimed at DOS networks that do not need PostScript printing capabilities.

The 4Si uses the same engine as the one found in the 4Si MX but has only 2 Mbytes of RAM and a high-speed parallel port, lacking the PostScript, Ethernet and LocalTalk capabilities found in the 4Si MX.

You can upgrade a LaserJet 4Si to the 4Si MX by purchasing the $799 PostScript option, the appropriate JetDirect network interface card and at least 8 Mbytes of memory. (If you are printing solely on an Ethernet network, you do not have to purchase the LocalTalk card.)

For this review, we looked only at the LaserJet 4Si MX.

reviews FORUM

What exactly are flopticals, anyway?

The comparison article titled "Floptical drives not solid choices" by R. Bradley Andrews (MacWEEK, April 12) did not give floptical technology a fair shake. This article was supposed to be a comparison, when, in reality, it compared floptical drives with both SyQuest removable and fixed hard disk drives. Floptical technology is intentionally directed toward competing with floppy disk technology. This is why floptical drives are compatible with 21-Mbyte floptical media, as well as standard 1.44-Mbyte floppy media. The article also did not point out the floptical technology migration path to 40-Mbyte capacities and beyond.

Floptical drives are just as incompatible with 800-Kbyte floppy drives as standard 720-Kbyte floppy drives are. Apple made 800-Kbyte floppy drives unique. We don't believe anyone will make a drive compatible with an Apple 800-Kbyte floppy drive.

At the time of your article, our floptical subsystem for the Mac was going through a transition period. In fact, as your article pointed out, one of our technical people contacted MacWEEK to try to get new software and documentation to MacWEEK. Both Rancho Technology Inc.'s software and documentation for the Mac have been totally changed. All issues focused on by the MacWEEK article about Rancho's floptical subsystem have now been totally resolved.

John A. Fobel, vice president
Rancho Technology Inc.
Rancho Cucamonga, Calif.

We were dismayed to find that your reviewer misunderstands the difference between a floppy disk drive and fixed and removable hard disk drives. This is also surprising, as your magazine has given us regular coverage since the introduction of the floptical disk drive.

This misunderstanding reminds me of the man who, when asked his opinion of mountain bikes, said, "I'd rather have a motorcycle." That may be his opinion, but it doesn't change the fact that it's beside the point. When you're talking mountain bikes or very high-capacity floppy disk drives, you're still talking bikes and floppies, not motorcycles or hard disk drives.

A floptical disk may hold 14 times more data than a conventional 1.44-Mbyte disk, but it's still a floppy. And it may read and write downward to 1.44-Mbyte disks, but it's still a floppy. Floptical disk drives may be three times faster than conventional floppy drives, but they're still floppy drives. The point is that floptical technology is a floppy technology and because of its capacity, downward attributes and speed, it will be every user's next floppy drive.

Users need a very high-capacity floppy drive to keep up with the very high-capacity removable-media tasks — whether graphics, database or multimedia applications, near-line storage, backup, or program distribution. Users will need Bernoulli, SyQuest and magneto-optical products for other tasks. And some applications may overlap — but neither type of storage is a substitute for the other.

This doesn't sound like a technology that is "too little, too late." The lineup of floptical suppliers and supporters suggests the opposite conclusion. The growing list of more than two dozen companies — 3M, Maxell Corp., Microsoft Corp., Hewlett-Packard Co., Silicon Graphics Inc., Iomega Corp., Maynard Electronics, Matsushita Electric Industrial Co., Chinon America Inc., Sysgen Corp., Grass-Roots, PLI, Rancho Technology Inc., Adaptec Corp., Future Domain Corp., Corel Corp., Data Technology Corp. and the leading distributors worldwide — includes many companies known for market savvy. So also do the tens of thousands of users who've already implemented floptical systems on their Macs, workstations and PCs.

Mike Peak, secretary
Floptical Technology Association
Cupertino, Calif.

The Iomega Floptical Subsystem is a bigger, better floppy — a 21-Mbyte floppy and a standard floppy in one — rather than "too little, too late" as reported by R. Bradley Andrews in his review. Andrews presented this exciting new technology primarily in comparison with more-expensive, higher-capacity removable-disk products. This is not the appropriate comparison.

For the commanding majority of Mac users, 800-Kbyte and 1.44-Mbyte floppies remain the medium for interchange, distribution, backup, archival and application installation. Virtually all Mac users work with floppy disks. The biggest problem is that 800-Kbyte and 1.44-Mbyte floppy disks just aren't big enough anymore. With floptical technology, floppy storage is real storage once again. Delivering 14 times the capacity and three times the performance of a SuperDrive, the Iomega Mac Floptical Subsystem is delighting our customers. Seen for what it really is — the emerging 3.5-inch floppy standard — floptical is an exciting step forward.

Floptical products provide the lowest entry price and the lowest per-disk media price of all the products Andrews compared in the chart on Page 54. But again, even though favorable to floptical, this is not the appropriate comparison. Floptical products provide users full compatibility with SuperDrive 1.44-Mbyte disks and 21-Mbyte capacity for about the same installed price as a SuperDrive upgrade for Mac systems requiring a ROM and floppy controller upgrade. Apple sales of these upgrades continue at a brisk pace, so the Mac managers in your reader base who are contemplating a SuperDrive upgrade would do well to investigate floptical as a superior and cost-effective alternative.

Upgrades aside, schools, large businesses, service bureaus and many others are standardizing on floptical technology because existing floppies lack sufficient capacity, not in the stead of more-expensive, higher-capacity drives noted. Compatibility with millions of installed-base floppy drives and inexpensive disks that look and feel just like a floppy but hold more than 20 Mbytes makes a compelling argument in the favor of floptical technology for many Mac managers.

Floppy industry luminaries such as 3M, Maxell and Chinon have joined with more than 20 other companies to form the Floptical Technology Association. The FTA provides a further demonstration of floptical's emergence as a de facto standard.

Point of clarification: "Bernoulli" is not part of Iomega's floptical product name, as was reported in error in the review. Bernoulli is the name of a technology Iomega employs for its 90- and 150-Mbyte high-performance disk products.

Steve Wise
Floptical product manager
Iomega Corp., Roy, Utah

MacWEEK replies:

We are glad to see that Rancho has fixed the problems with the original shipping unit.

With respect to the comparison issues, while it is fine to say that floptical drives are really floppy drives and thus should not be compared with removable-storage devices, the fact remains that comparisons to SyQuest and magneto-optical drives are not unreasonable.

Users looking for ways to increase their storage capacity without purchasing an additional hard drive look at convenience, cost, flexibility and availability. Floptical

See Forum, next page

Forum

From previous page

drives are surely convenient and their availability is improving, but their cost is still high, and the flexibility angle is questionable.

We understand that the inability to read 800-Kbyte floppies is not necessarily the problem of the floptical vendors, but it is a fact that has to be dealt with in some form.

This is especially true when you consider that most vendors continue to ship software on 800-Kbyte disks. For Macs without floppy drives (such as PowerBook Duos), with problematic floppy drives, or those that are not SuperDrive-compatible and still upgradable (which is only the Mac II), this is the primary reason why floptical drives are not a viable option.

This is partly a "chicken-and-egg" issue, but for floptical drives to gain market share, they must add something more than what they currently offer to the user. As the price of units drops and capacities increase, floptical will look more attractive, but the specter of other removable technologies will always be present.

Wacom's ArtZ tablet allows user to throw away mouse

Sitting in front of my Mac, working on an image with Adobe Photoshop 2.5 and using my ArtZ tablet from Wacom Technology Corp., it was with great interest that I read your articles on both products in the same issue (MacWEEK, March 22). I could not agree more.

You missed the one point about the ArtZ tablet that really sets it apart from the competition. In addition to mapping a tablet position to a screen position, which is standard fare for all tablet input, this tablet's software allows relative placement.

In other words, it works like a mouse. If you reach the edge of the tablet, you can pick up the stylus, move it back and keep on going. This makes a huge difference in how a designer interacts with the computer, requiring substantially less hand motion. I had the previous serial version of this hardware and seldom used it because of the absolute mapping. I bought the ArtZ tablet on first sight at Macworld San Francisco and have retired my mouse.

Keep up the good work.

Ross J. Slade, president and senior designer
RJS ID Inc., Ottawa

Send your comments to MacWEEK Reviews Department, 301 Howard St., 15th Floor, San Francisco, Calif. 94105. MCI (323-1203); fax (415) 243-3650. Include your name, address and phone number. We reserve the right to edit for clarity and length.

Tempo

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quate, if a little disorganized and lacking in sample macros. On the other hand, some useful sample macros, such as those for batch processing in Microsoft Word, are included on the disk, and these offer a good introduction to the program. Tempo II Plus is one program that could really use balloon help but doesn't offer it. We found Affinity's technical support, however, to be very good.

Upgrades are $30 for current Tempo II Plus users, $49 for Tempo II users and $79 for Tempo 1.x users.

Conclusions. Version 3.0 is a welcome upgrade to Tempo II Plus. For the most part, we like its user interface for recording macros and some features, such as the ability to play any macro quickly with just a few keystrokes.

A big plus, which may prove a deciding factor for potential users, is the way that macros can branch to one another.

Overall, however, Tempo does not offer the range of built-in functionality of QuicKeys, which may be what tilts users in QuicKeys' favor when choosing a macro program.

Affinity Microsystems Ltd. is at 1900 Folsom St., Suite 205, Boulder, Colo. 80302. Phone (303) 442-4840 or (800) 367-6771; fax (303) 442-4999. □

SYSTEM 7 COMPATIBILITY

Tempo II Plus 3.0	
Balloon help	No
TrueType	n/a
Publish and subscribe	n/a
Apple events	Yes
32-bit addressing*	Yes

**According to vendor.*

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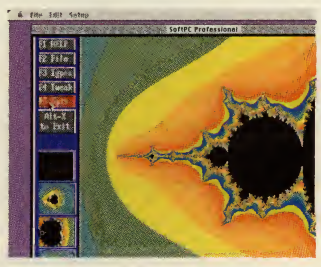
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Comparison

MIDI modules are right in tune with needs of Mac presenters

SoundCanvas SC-55, TG100 both offer solid features for their price.

By Ben Long

Two General MIDI sound modules, Roland Corp. U.S.' SoundCanvas SC-55 and Yamaha Corp. of America's TG100 are self-contained synthesizers aimed at the amateur musician and multimedia presenter.

These sound modules produce sounds in response to any MIDI (Musical Instrument Digital Interface) input. To use one, you need a MIDI keyboard, drum machine, and a MIDI-equipped computer with sequencing software or other input device.

SoundCanvas SC-55. The SoundCanvas, priced at $825, is a small (about 8.5 by 11.7 by 1.75 inches), rackmountable module that, at just more than 3 pounds, is quite easy to transport. The back of the unit contains MIDI In, Out and Thru connectors, as well as RCA jacks for audio output and input.

To use it with a Mac, you'll need a hardware MIDI interface (which converts your Mac's serial data into MIDI format, as well as provides the necessary physical connection).

The controls on the SoundCanvas' front panel are both comprehensive and comprehensible: Almost everything you might need to do can be accomplished through the simple-to-use buttons on the front of the unit. A second MIDI In port is on the front panel. Messages from both ports are combined and treated as one input. A headphone jack and volume control are also conveniently located on the front panel. A large, four-line, backlit display shows the values of all modifiable settings in addition to a bar-graph display showing which channels are currently active and how loudly each channel is playing.

Music on the SoundCanvas is divided into up to 16 parts. Each part can have an instrument, MIDI channel and volume level, as well as a Pan setting for placing the part within a stereo field. You can also apply a Chorus or Reverb effect to each part or transpose up or down the scale in semitone steps. And you can easily set all of these parameters from the dedicated controls on the front panel — no odd combinations of keys are necessary. In addition, a Mute switch lets you temporarily turn off any channel.

Most users will probably find the SoundCanvas' factory settings adequate for their needs. Advanced users can alter a wealth of settings through a menu system. By pressing particular combinations of controls, you can navigate your way through menus governing everything from MIDI send-and-receive controls to pitch-bend range and modulation depth. Sound priority can be defined for users who might exceed the SoundCanvas' 24-note polyphony.

If none of the unit's 128 sounds is quite right, you can edit a sound by detuning it or changing its ADSR (Attack, Delay, Sustain and Release) envelope, vibrato rate, resonance and cut-off frequency. All parameters, settings and changes are stored in memory even after the unit is turned off, and they are maintained by a lithium battery. Settings can be dumped via MIDI to a sequencer, letting you easily switch between multiple configurations.

These advanced features are easy to use if you can remember the key combinations necessary to navigate the menus. If you must consult the manual, however, you'll find it's comprehensive but far from an easy read.

For those of you who dread having to get out of the La-Z-Boy to change settings on your synthesizer, Roland includes a remote control with Instrument, Volume and Reverb buttons. Since the remote doesn't work beyond 15 feet or near other equipment that uses a remote, most users will probably find little use for the device, which is OK because it's so small that you'll probably lose it immediately after opening the box.

In addition to the General MIDI specification, the SoundCanvas conforms to Roland's own GS standard, which defines certain characteristics of a sound module. A GS-compatible sound module has 16-part multitimbral capability with at least 24-part polyphony. In addition, GS specifies that a sound module's reverb, chorus and certain other functions can be controlled via specific MIDI commands.

TG100. Though somewhat smaller than the SoundCanvas (8.6 by 7.7 by 1.6 inches and weighing a little more than 2 pounds), the $449 TG100 has a very unique feature: a built-in MIDI interface. By plugging the appropriate cable into the To Host jack on the back of the unit and flipping a selector switch between MIDI, Mac and PC, you can plug the unit directly into your Mac's serial port. This is a more convenient arrangement than using a separate interface.

The aforementioned appropriate cable, however, is not included with the TG100 and is nonstandard enough that it must be purchased from Yamaha (it is priced at $14.95). Pin-outs are included in the manual for those who feel like creating their own cable. For presentations and performances on the go, the convenience of built-in MIDI is well worth the hassle of scaring up the necessary cable. For those who are adding the unit to an existing MIDI system, the device is also equipped with standard MIDI In, Out and Thru ports.

The TG100 also contains audio-out ports as well as a single audio-in port. Though General MIDI may be standardizing the use of MIDI channels, standard cables are a different matter. To use these two devices side by side, we had to find two RCA plugs to get the audio out of the Roland box, quarter-inch phone jacks to get the audio out of the Yamaha, RCA cables to get audio into the SoundCanvas and a miniadapter to get audio into the TG100. Add a few more MIDI devices and you'll soon find that you must have several of every type of cable in the world and a few adapters and gender changers, just to be safe.

The front of the TG100 houses a one-line nonbacklit LCD display, a volume control and a headphone jack. Six small buttons placed next to the display are used in different combinations to perform all of the unit's functions.

Like the SoundCanvas, the TG100 supports 16 parts and can play up to 28 notes simultaneously. One hundred ninety-two instrument voices and 10 drum kits, stored in ROM, can be further manipulated through the front-panel controls. Edit features include Reverb, Pan, Attack, Release, Detuning and Volume. Because the TG100 has no internal battery backup, all changes and edits are lost when the power is turned off; therefore, to save edits and configurations, you must dump your data to your sequencer or sequencing software.

Besides lacking some of the SoundCanvas' editing features (most notably a Chorus effect), the TG100's editing abilities suffer from a convoluted interface that involves pressing combinations of different buttons while reading obtuse abbreviations on a one-line, nonbacklit screen. The frequent user might eventually feel comfortable making changes without having the manual handy, but most will probably find themselves flipping repeatedly through the competent, though expert-level, user manual.

Sounding off. In the end, it is the sounds produced by the machines that will make up most

See MIDI, next page

What is a General MIDI sound module?

MIDI (Musical Instrument Digital Interface) is a protocol that allows digital musical instruments — from computers to synthesizers to drum machines — to communicate with each other. Through MIDI, musical data is sent across different channels, allowing, for example, your MIDI-equipped computer to tell your synthesizer to play one part of a song, your drum machine another and your MIDI-compatible accordion yet another. MIDI supports up to 16 of these channels.

Until recently, there was no standard way to preset similar sounds on different MIDI synthesizers or sound modules: One synthesizer might have a piano assigned to Preset (or "patch") 1, while another might have Preset 1 configured for bagpipes. So there has never been any guarantee that a sonata for two violins on your synthesizer wouldn't sound like a duet for trombone and spoons on someone else's.

But recently, the MIDI standard was expanded to include the General MIDI specification. MIDI devices conforming to this spec have the same instruments, or patches, assigned to the same presets — the quality of the sounds will vary, but the instruments should not. — By Ben Long

score card

General MIDI sound modules

Two General MIDI sound modules provide self-contained MIDI sound generation for use with Macs and other MIDI "instruments." They're both capable music producers, well-suited to on-the-go multimedia presentations and home musicians.

▶ **SoundCanvas SC-55** from Roland Corp. U.S. is more than twice the price of the TG100 (once you buy a required MIDI interface), but it has impressive sound quality, some digital effects and a manageable interface. For its price, it produces superior sound to the TG100 and is more convenient to use than the TG100. Overall, the SoundCanvas is also a good value.

▶ **TG100** from Yamaha Corp. of America, with its built-in MIDI interface, is easy to transport and set up, making it ideal for presentations. The unit's toylike sounds and cryptic controls hamper an otherwise very good product, but for the money, the TG100 is a good value.

	SoundCanvas SC-55	TG100
Overall value	◆◆◆	◆◆◆
Price	$825	$449
Performance	◆◆◆◆	◆◆◆
Features	◆◆◆	◆◆◆
Compatibility	◆◆◆◆◆	◆◆◆◆◆
Configuration	◆◆◆	◆◆◆
Documentation	◆◆◆	◆◆◆◆

MIDI

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users' minds. Though neither device will fool anyone — they both sound like synthesizers — the SoundCanvas produces instrument sounds with a much broader range and brighter feel. At times the TG100's sounds are so muddy that you're unable to hear certain notes.

We tested both units with several MIDI files created by Passport Designs Inc.'s Producer. We couldn't recognize a samba file on the TG100 as the same song we had heard on the SoundCanvas — a problem, as in theory these General MIDI files were supposed to sound, at the very least, similar on both devices.

In several cases, the SoundCanvas' instruments sounded not only brighter but more realistic. The TG100's piano and brass sounds had a distinct toylike quality about them, as if they were plastic instruments.

An added benefit for the multimedia user is the audio-in port provided by both units. By plugging a standard microphone into the audio-in port of either machine, you get an instant PA system that automatically mixes with the MIDI-generated music — one less piece of equipment for the laptop-toting presenter to carry around.

Conclusions. For multimedia presenters who want real-time MIDI accompaniment for their presentation, either unit will provide a full-featured, easy-to-transport solution. If the SoundCanvas' sounds and controls could be combined with the TG100's built-in MIDI interface and extremely low price, you would have the ideal portable multimedia sound module.

Professional musicians will probably find both modules' sound quality and inability to download new sounds serious limitations, but for home musicians or multimedia presenters, the size, convenience, power and price of either unit add up to an equally good value.

As with any audio equipment, your ears should be the final arbiter. These units must be heard to be fairly compared. □

Product Info

ROLAND CORP. U.S.
SoundCanvas SC-55: $825
7200 Dominion Circle, Los Angeles, Calif. 90040
Phone (213) 685-5141
Fax (213) 726-8865

YAMAHA CORP. OF AMERICA, DIGITAL MUSIC INSTRUMENTS
TG100: $449
P.O. Box 6600, Buena Park, Calif. 90622
Phone (714) 522-9011

IN BRIEF



- Apple Adjustable Keyboard
- Safe & Sound

Adjustable Keyboard

Apple's ergonomic device is a step in the right direction

Although our control of the Macintosh depends completely on its mouse and keyboard, it often seems that these components are barely given peripheral attention in design and marketing. We hear more about the fine points of processors, caches and clocks than we do about the devices that form every one of our commands.

Trailing behind researchers and customers but leading its competitors, Apple has taken one small step toward relieving the inhumane design of traditional keyboards. With its $219 Apple Adjustable Keyboard, the company has addressed one particular aspect of keyboard ergonomics in a product that is a strange mixture of function and style.

The Adjustable Keyboard looks like a prop from "Star Trek." The package includes a keyboard that splits in the center to angle the left and right rows of keys out toward your arms. Five click-stops are provided for angles from zero (like a traditional keyboard) to 30 degrees. The rows of keys remain parallel to the desktop, but legs in the back offer a choice of two forward tilts.

A large, rounded space bar stays in the center as the keyboard splits. Three small buttons to the right of the typing keys change the volume of the Mac's speaker. A fourth button starts and stops sound recording if appropriate sound-input hardware and software are available.

A large, separate unit incorporates a numeric keypad; cursor keys; and an unusual array of small, recessed function keys surrounded by a labeling template.

The extended keypad connects to the main keyboard via a short Apple Desktop Bus cable included in the package. The keyboard also can be used without the extended keypad.

Curved, hard-plastic wrist rests may be attached to the left and right sides of the main keyboard. Another wrist rest, which attaches to the keypad, is asymmetrical and extends only part of the way across the unit.

An Installer floppy supplies an installation script and operating system extensions required to support the hardware.

Layout. The touch of the normal keys is similar to that of the Apple Extended Keyboard II. The function keys, Escape key, power-on key and sound-control keys are much stiffer. Ironically, this stiffness is likely to aggravate the sort of repetitive stress injuries that an ergonomic keyboard should minimize.

The function keys are arranged in a three-by-five-key matrix on the extended keypad, which will be confusing to people accustomed to the normal arrangement.

Option and Control keys are provided only on the left side of the keyboard, an irritation for people who mouse left-handed, but a Command key is available on both sides. The only Enter key is on the extended keypad.

Cursor keys are provided in two different configurations, on the main keyboard and on the extended keypad. A large Caps Lock key sports a green indicator light.

Impressions. As a touch-typist with repetitive-stress problems, I found at first that the Adjustable Keyboard simply changed the problems to different areas of my wrists.

After a period of experimentation and adjustments, the keyboard eventually became more comfortable for straight typing than my previous choice, the Apple Extended Keyboard.

Some irritations remain, however, after several months of use. On the keyboard, I frequently press the Caps Lock key by accident, and I miss the Option key on the right side. (Surprisingly, the speaker-volume keys have been useful, although the recording button seems silly.)

More significantly, the separate keypad seems like a step backward. For all the desk space the keypad hogs, its function keys are harder to use, and it moves important keys far away from the main keyboard on the right side.

The connecting cable is too short to move the keypad easily without shutting down and recabling, and its wrist rest seems dysfunctional.

Conclusions. The Adjustable Keyboard is no panacea for people suffering from repetitive-stress problems. The adjustment addresses only one dimension of a multidimensional problem, and several aspects of the design — especially the function keys — appear to be driven by style at the expense of ergonomics.

Although the value of the keyboard is highly subjective, Apple provides no trial period or satisfaction guarantee. (There is a one-year warranty on hardware materials and workmanship but no warranty on software.)

Despite these issues and initial delays in availability, the Apple Adjustable Keyboard represents an important first step toward humanizing our interface with the machine. At a reasonable premium in price, it can offer some relief to typists now. If we are lucky, it may lead the way toward more significant ergonomic advances in the future. — *By Ric Ford*

Safe & Sound

Central Point's $49.95 util makes disk recovery easy

Safe & Sound is a new simple-to-use, $49.95 hard disk recovery utility from Central Point Software Inc., the company responsible for the popular, full-featured MacTools disk repair and maintenance software.

Central Point lifted the DiskFix program from the $149 MacTools and customized it for stand-alone use. In this new format, Safe & Sound gives nontechnical Mac users a simple way to automatically find and fix the most common hard disk problems. Safe & Sound checks for and corrects three types of errors: corrupted physical media, incorrect file attributes and virus infection.

According to Central Point, the package fixes more than 100 of the most common hard disk problems (subsets of the three aforementioned), and we found that it correctly handles the most common errors. Most significantly, it will recover files from a damaged disk to another disk (splitting them if more than one backup disk is required) and can restore the files once the hard disk has been repaired or replaced.

In addition, options can be set to alert you to a number of other problems including:

- Files that have not been backed up since the last scan.
- Multiple System files.
- Bad dates.
- Excessive numbers of fragmented files.
- Bad or missing bundle bits.

The program won't repair most of these problems, referring you instead to a more complete disk maintenance package, which Central Point clearly hopes will be MacTools.

Safe & Sound comes with both high- and low-density start-up disks. An eight-page, easy-to-read manual covers all the basics. The main program launches as soon as the Mac starts up, and begins to automatically scan all available disk volumes. You can abort the process and select a single volume to check.

When a problem is encountered, you can choose to either repair or ignore it. You can save information about most repairs onto another disk, so the repairs can be reversed later, if necessary.

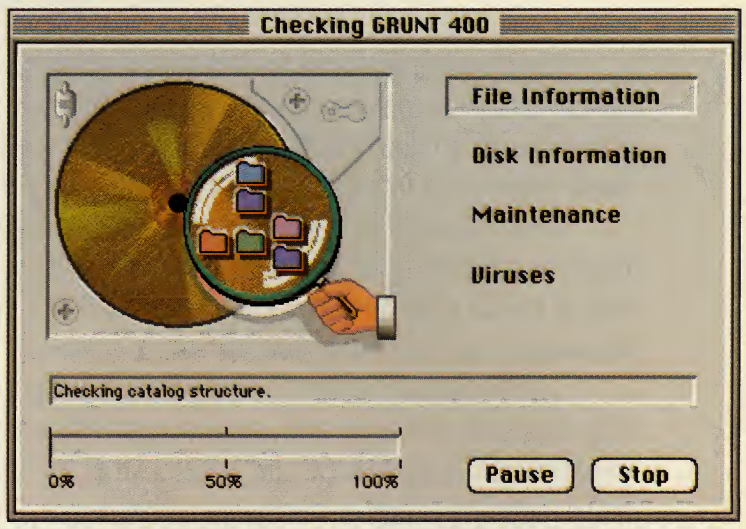
The program does have one potential problem spot: Apple's System Enablers. Central Point has added a set of these files to its start-up disk. At press time, Safe & Sound supports the PowerBook 160 and 180, Duo 210 and 230, IIvx, and the Performa 600.

While earlier Mac models — which do not require enablers — work fine with the package, later models may require that you create a custom version of the program disk. Central Point's technical support, available free to registered users, should be able to help.

Users of Safe & Sound can upgrade to MacTools for $49.95, which makes it a particularly good way to preview the full-featured application.

Managers supporting remote users could supply Safe & Sound for use in emergencies, secure that even novices will have no trouble using the software. Given the low price, the upgrade path to the full MacTools package and the solid features, this is a very good buy.

Central Point Software Inc. is at 15220 N.W. Greenbrier Parkway, Suite 200, Beaverton, Ore. 97006. Phone (503) 690-8090 or (800) 445-4208; fax (503) 690-8083. — *By R. Bradley Andrews*



When Safe & Sound is launched, it immediately begins a scan of all mounted disks. The user only has to click the OK button in the event that a problem is discovered.

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Lower cost of ownership. *When server management is easier, it's also less expensive. The ease of use of AppleShare Pro translates into dramatic cost savings over time — in both single-server and multiple-server environments.**

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*AppleShare administration averages $10,000 per year less than other systems, according to the Business Research Group (BRG) study "Lifecycle Costing for PC LAN Administration — A Comparative Analysis of 5 Leading NOS Environments." Environments compared were AppleShare,
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Now serving Windows. *New software from Apple and Farallon lets MS-DOS and Windows users connect easily to the Workgroup Server 95 and Apple printers.*

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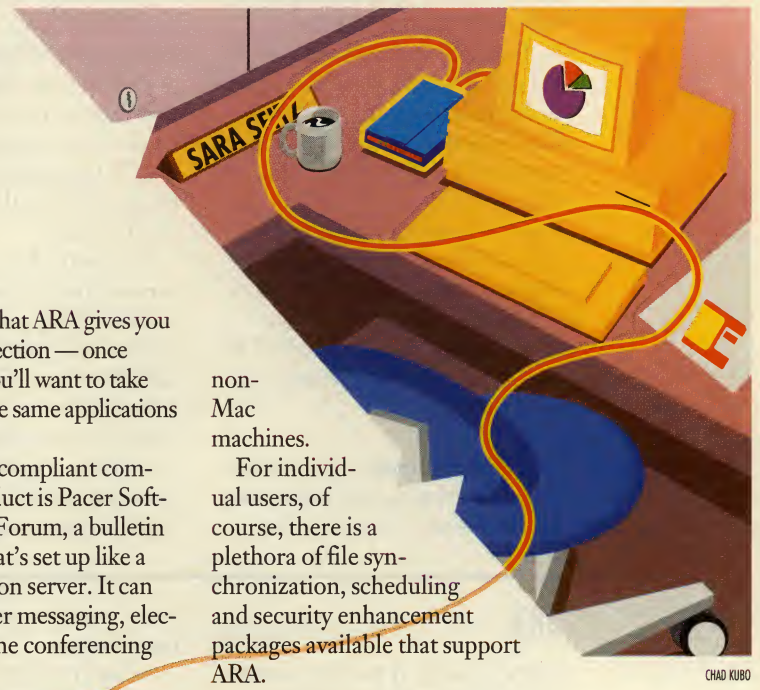
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PRODUCT WATCH

- Buying info
- Expert advice

Remote-access products are fostering ARA connections



CHAD KUBO

AppleTalk Remote Access has made the dream of telecommunicating more real than ever.

By Mitzi Waltz

AppleTalk Remote Access was originally conceived as a single-user software package, its fate tied to the acceptance of the PowerBook. Even Apple has been taken by surprise with the way its use has grown. No longer just for traveling salespeople dialing in from their motel room to grab product information and upload orders, it's now in use at many corporate sites for multi-employee telecommuting.

And therein lies a problem: ARA still requires a dedicated Mac or third-party hardware device running the corresponding host version. Its built-in security features, while stronger than those of many other remote-dialing applications, may not be sufficient for some situations.

ARA also doesn't fully support the super-high-speed modem connections provided by devices such as Focus Enhancements Inc.'s Focus 14.4 Fax/Modem, which offers data transfer speeds of up to 57,600 bps, that telecommuter-heavy companies are counting on to make their remote workers seem more like "real-time" employees than distant, hovering file grabbers.

Multi-user ARA future? Whether Apple plans to make the leap to multi-user capability itself is unclear, although this year's much-ballyhooed foray into workgroup solutions should indicate a direction. "There are some things within ARA, particularly in the way error correction is done, that we're looking into for things like cellular communications," said Garry Hornbuckle, Apple connectivity product evangelist. "Certainly Apple is looking at a number of ways to enhance ARA."

As for the speed and management problems mentioned by users, Hornbuckle said: "We've heard these issues before. We think ARA has a number of good security features in it — encrypted passwords; call-backs; the ARA security zone, which prevents users from setting up unauthorized servers. It's a risk-reward trade-off and, ultimately, security systems are only as good as the physical security of the machine."

Perhaps future versions of Apple's new workgroup servers will incorporate multiport technology, but the company is not talking about it.

Multi-user ARA present. Companies that already have several users clamoring for ARA needn't wait for Apple to make a move. Third-party companies have been active in developing companion products since the product's release date. Even some applications that predate Apple's program, such as Farallon Computing Inc.'s Timbuktu for Macintosh, have been revised to work with it.

Timbuktu, for example, is now optimized for use with ARA, making it especially handy for remote network management. And since Farallon now offers a version of Timbuktu for Windows, users can access PC-based resources on mixed networks by combining the two packages.

"Timbuktu can give you remote access directly to your desktop machine," said Perry Debner, Farallon product marketing manager. "It provides an easy way to exchange files with your remote desktop or any other Timbuktu user on the net, and to control other machines through screen sharing. What ARA gives you is a network connection — once you've got that, you'll want to take advantage of all the same applications you're used to."

Another ARA-compliant communications product is Pacer Software Inc.'s PacerForum, a bulletin board package that's set up like a dial-up information server. It can provide multi-user messaging, electronic mail, on-line conferencing and more.

Employees of Telemorphix, a San Francisco-based "virtual company" that is run entirely on a PacerForum board, have made extensive use of ARA, according to president and co-founder Andy Harris. The 20 workers who are collaborating on television production projects get full use of network resources by combining the two products, he said.

ARA's lack of support for off-line message creation and multi-user installations are problems, Harris said, but he expects to see them addressed soon.

Pacer also offers PacerTerm, a terminal-emulation package that can handle remote access over AppleTalk to VAXes and other non-Mac machines.

For individual users, of course, there is a plethora of file synchronization, scheduling and security enhancement packages available that support ARA.

Handy hardware. To centralize remote-access services and minimize management headaches, many companies are turning to multiport ARA servers from Shiva Corp. and Cayman Systems Inc.

Christopher Evans, director of software development at Cambridge, Mass.-based Natural Intelligence Inc., has installed a Cayman GatorLink server for standard dial-in access using ARA or Apple's TCP/IP Connection for Macintosh (formerly known as Mac TCP/IP).

In addition, Evans said, his company is working on ways for clients to call in remotely and get the latest updates on Natural Intelli-

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Case Study

ARA: Out on a limb at Johnson & Johnson

Employees boost productivity by jumping on the ARA train.

By Mitzi Waltz

At Johnson & Johnson Orthopedics Inc. of Raynham, Mass., the plunge into remote access started when a few employees wanted to keep in touch with the office while they were on maternity leave or working odd hours. The company installed a NetModem from Shiva Corp. to provide direct-dial remote access to its Mac network, and everything was fine — until the demand for dial-in service grew and callers started to get busy signals.

"As soon as two people tried to use it at the same time, we knew we had to do something else," said John Parker, senior communications analyst. Parker's solution was Shiva's four-port LanRover/E and a toll-free number to keep employee phone bills out of the stratosphere.

Now the list of daily users is up to six, with others calling in occasionally and 12 on a waiting list, and that number continues to grow. "We're getting a lot of the new Duo Docks, and we need to set them up for remote computing as soon as they come in," Parker said. The portable Duo CPU requires a third-party hardware device for AppleTalk Remote Access (ARA) connection to home-office network resources.

Johnson & Johnson's attitude toward telecommuting is generally positive, Parker said, although purchasing delays have prevented him

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Johnson

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from offering the option to all comers as yet. "These days everyone expects employees to give 110 percent," he said. "For any employee who needs to do work at home, we'll actually lend portables out."

For ARA users, the No. 1 reason to dial in is to pick up electronic mail, followed closely by picking up individual files, Parker said, adding that the latter capability is a special boon for frequent-flier types. "When you're packing up to go on a trip or something, you don't always want to take your hard disk with you," he said. "This way it's not a disaster if you forget something."

ARA problems. All this enthusiasm doesn't mean that implementing a multi-user ARA system has been problem-free. Security has been one concern, Parker said. "You repeat your password before you connect — but if you key it in wrong, it'll go through the process of connecting you, but then you can't do anything," he said. "You have to quit, call back and try again."

On the other hand, users can save their passwords on their machines, which leads to disquieting possibilities. "If that machine was stolen," he said, "all [the thief] would have to do is dial in."

Although ARA has allowed offsite employees to keep in touch and is even helping one manager to work at home once a week, Parker said it hasn't provided the fast transmission rates necessary for true telecommuting.

"We're not getting the speed we were hoping for," he said. "I think Apple is going to have to do some work on getting together with the modem vendors and taking advantage of the optimal speeds they now offer. At 14.4 [Kbps], it's just not fast enough."

Another change Parker said he hopes to see soon is implementation of Internet Protocol support to provide users with more options on-line, such as linking with non-Mac resources, other platforms and Internet E-mail.

"Our company goes from mainframes down to small machines, and IP's the de facto standard," Parker said. According to some experts, as Apple moves toward high-powered machines that are even more likely to be part of multiplatform installations, such as the Power PC machines, IP support may be considered an ARA feature instead of as an afterthought that requires a router.



TONY RINALDO

John Parker, senior communications analyst at Johnson & Johnson, gets into his office using ARA, a PowerBook and a cellular phone line.

Along with multi-user capability, IP support would be a high priority if Parker could take control of Apple's ARA development team, he said. "The LanRover/E definitely requires administration — it's just one more account you have to keep. Integrating it all would be much better." □

ARA

From previous page

gence's custom databases — and for workers at home or other remote development sites to upload their latest changes.

With Cayman's three-port GatorLink server, remote users can gain access to all resources on an Ethernet network, including E-mail, network-management programs, printers and file servers. Rather than using off-the-shelf file-synchronization software for these tasks, Evans and his team used built-in capabilities of Cupertino, Calif.-based ACI US Inc.'s 4th Dimension to write their own 4D-specific synchronization routines.

As for the Cayman server, Evans said: "It's real simple. Before we had one line set up going to a Classic II. When we wanted to add another line, the question was, 'Do we use another Mac or go with something like the Cayman box?' On a per-port basis, GatorLink was cheaper, and once you put it on Ethernet, you get the speed advantage as well."

GatorLink supports Security Dynamics' SecurID ACE/Server Security system, a stand-alone device that lets managers authenticate users, but Evans has not taken advantage of the added layer of protection. "We don't need that level of security. There's a single central location where we can set all the passwords, and it's easy to change those or delete users if we need to."

So far, Natural Intelligence's greatest problems have been with employees who use TCP/IP to dial in from home. "If I'm working at home and I get an IP address here at my work office and do my TCP/IP stuff, then dial in to a client site that has a different IP number, I have to restart, for example," Evans said. "At least that's the case with Version 1.1."

Shiva's LanRover/E ARA servers come in four- and eight-port versions, also giving managers the ability to centralize telecommunications (see story, previous page).

Farallon offers the Liaison Internet Router, which can enhance or replace ARA access and supports unlimited users on a single server. Liaison can connect whole AppleTalk, Ethernet or token-ring networks, providing both sides with access to the combined set of network resources. It also lets ARA users utilize non-Mac resources via Internet Protocol. The same IP

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AppleTalk Remote Access substitutes for multi-user remote access

Apple Remote Access is a powerful tool that can make users on the run or at home feel as though they're right there in the office. With full control over their office workstation, they have access to all network devices, electronic mail and other comforts of the home office.

However, endless long-distance calls are not free. Mac resources may not be the only ones workers need to use. And tying up workstations for remote users that could be pressed into other service may not be the best use of CPUs at many sites. Luckily, there are several direct-access alternatives that allow users to link up without using either ARA or hard-to-manage direct modem connections.

Multiplatform remote. For many companies, remote computing will be an occasional thing until ARA supports more than just the AppleTalk protocol. Internet Protocol is supported by a separate Apple server that can work with ARA and by Farallon Computing Inc.'s Liaison Internet Server, which can work independently as a network-access tool.

Another protocol of interest to many managers is Point-to-Point Protocol (PPP), a successor to Serial Line Internet Protocol that can transmit Internet Protocol packets and supports other protocols as well. Plans for PPP support have been announced by Cayman Systems Inc., Shiva Corp. and other vendors.

Farallon's Timbuktu can already link Mac users remotely with PCs running Windows, if both have the screen-sharing package installed.

The company bulletin board. Many companies have found that multi-user computer bulletin board services are easier to maintain and require a lower investment of management time and hardware than setting up multiple ARA connections. Most Macintosh BBS packages, such as First Class from SoftArc Inc. of Scarborough, Ontario, and NovaTerm Professional from ResNova Software Inc. of Huntington Beach, Calif., can be used to send in-house E-mail to remote users, who pick up their messages whenever they dial in (see MacWEEK, April 5).

Often-requested documents, such as manuals, forms or price lists, can be permanently posted on BBSes. And these packages are perfectly configured for easy access and simple uploading and downloading of files, with built-in links to some desktop E-mail packages.

E-mail only. In fact, if access to E-mail and the ability to upload or download files is all that remote users need, several E-mail packages now support remote access. For $199 per client, QuickMail from CE Software Inc. can include a remote-access option, conferencing and the ability to attach files to messages. Microsoft Mail from Redmond, Wash.-based Microsoft Corp. and cc:Mail's cc:Mail Macintosh (via an optional cc:Mail Remote module, which costs $295 per remote user) have also incorporated remote access into their feature sets.

Mail*Link Remote, an E-mail gateway from StarNine Technologies Inc., can link groups of remote users, such as small satellite offices, with both Mac and Unix E-mail packages using the Unix to Unix Copy Program protocol. The gateway runs on a single Mac server at the home office, which can serve multiple callers.

According to StarNine, the most common use for Mail*Link is providing dial-up Internet connections. The company is also developing connections between disparate E-mail systems across phone lines, which could help companies establish small satellite offices that rely on remote links with headquarters.

Dial-up linkage. Companies can also choose to communicate with employees in the field via commercial E-mail services such as CompuServe or GEnie. In-house E-mail can often be routed through these services, allowing workers to upload and download files and messages at their convenience, without the hassle of making a direct connection with the office at all. Of course, these pay-to-play systems do require additional fees, but the savings on long-distance phone bills could be quite impressive, especially when the employee calling in is far from the office.

In short, until Apple provides an integrated multi-user version of ARA, companies that must support several remote employees can either enhance the single-user package with software and hardware from third parties or bypass it altogether.

The choice will depend on the type of access to resources needed by remote users and the willingness of telecommunications managers to build and work with complex, multivendor installations. — By Mitzi Waltz

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ARA

From Page 74

connection can be achieved by combining ARA with Apple's own AppleTalk Internet Router, but Farallon's product costs $500 less.

Apple-brand telecom. Apple is working on several software products of its own to enhance remote access. One of the first to come to market will be AppleSearch, a "client-client-server" (the extra "client" stands for remote users) text search and retrieval product that will include built-in remote-access capabilities.

"With AppleSearch, you can preset an indexing system that can query unstructured data on the server," said John McCready of Apple public relations. "For example, it could collect all the Taligent and Kaleida press releases for you … or set up scheduled 'newspapers' that it compiles for users. You could hook up in your hotel room and pick up your 'newspaper.' "

ARA fans will also see more from third-party companies. Global Village Communication Inc. of Mountain View, Calif., will release several modular ARA servers this summer. With a projected price of less than $750 per port, high security standards (possibly to include support for RSA Data Security Inc.'s public-key encryption scheme) and the ability to be managed from one Mac, these should provide cost-effective ways to control ARA access.

Depending on your company's needs, ARA can be as simple as dialing in to your own machine from home to grab a needed file or as complex as a server-based network of remote-access ports coupled with high-end security products and synchronization software.

With remote computing on the rise, managers can only hope that both Apple and third-party vendors continue to work on multi-user solutions that will address access and management problems before their sites experience telecommunications gridlock. □



We've always said that the Mac is a great workstation but a lousy server platform — now, Apple finally agrees. While Unix-based servers have their place, there are better ways.

COPS EasyServer AFP server

EasyServer™ is a better way. According to a *MacWeek* review (7/13/92), EasyServer is 1,000% faster than a typical Mac AppleShare server. With complete remote administration, EasyServer is easier to control. Removable Mac media (CD, Syquest, etc.) can be mounted and un-mounted on the fly. Hosted on a low-cost Intel 386/486 platform, EasyServer can use any Mac-formatted SCSI disk — *as is*, with absolutely no changes. *MacWeek* summarized it all by saying "... from a price/performance perspective it is hard to beat the EasyServer".

AppleTalk's not just for the Mac, so how do you provide easy connections for the PC? COPS has a couple of ways.

COPSTalk for Windows & DOS

While Apple simply announced the repackaging of their old AppleShare PC software (really just Farallon's PhoneNET Talk), "COPSTalk …offers advanced printing features that surpass both… PhoneNET PC and the Mac" (*MacUser* 4/93).

COPSTalk gives you complete control of your PostScript devices, and includes background printing, a font installer, AppleShare client (i.e. mount Mac volume as drive D:). Version 1.1, now shipping, adds many spiffy new features.

Supports LocalTalk (COPS, DayStar, and Farallon boards) and EtherTalk (any NDIS-compatible Ethernet adapter).

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Product Info

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GatorLink (three-port version): $1,445
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Phone (617) 494-1999 or (800) 473-4776;
fax (617) 494-9270

CC:MAIL, A DIVISION OF LOTUS DEVELOPMENT CORP.
cc:Mail Remote: $295 per workstation
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fax (415) 961-8400

CE SOFTWARE INC.
QuickMail (single-user pack; includes QuickMail Remote): $199
1801 Industrial Circle, P.O. Box 65580, West Des Moines, Iowa 50265
Phone (515) 224-1995 or (800) 523-7638;
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STARNINE TECHNOLOGIES INC.
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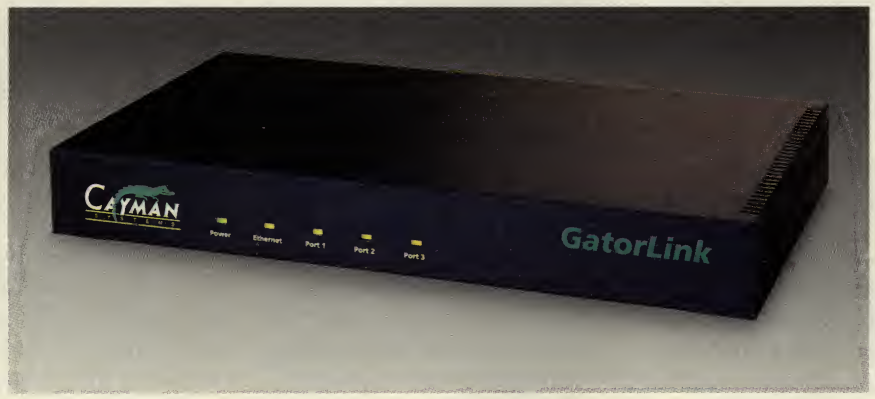
To start with, GatorLink is the first ARA server that actually allows multiple remote users to simultaneously access file servers, e-mail and printers on their corporate network. Just as if they were local nodes.

GatorLink is also the first product expressly designed to be a dedicated ARA server that connects directly to Ethernet.

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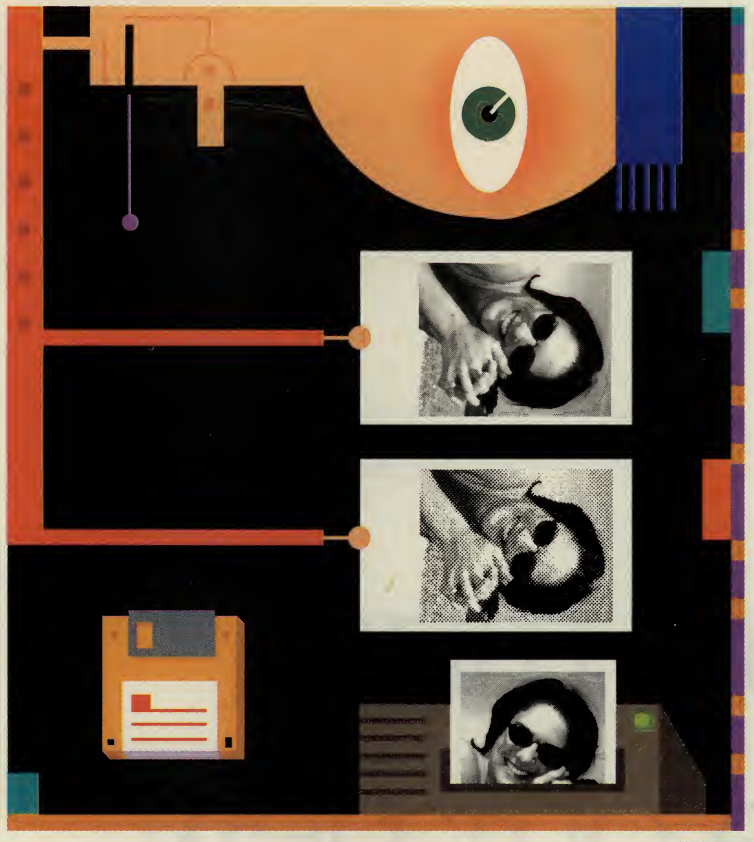
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Mixing and matching hardware, software

Apple is pumping more and more products out the door, and technical questions are outpacing official answers. Here are some tips.

BUGS & TIPS

Mixed messages. Apple's StyleWriter II printer offers several enticing advantages over the original StyleWriter, including better speed, the ability to share the printer over a network and special capabilities for printing gray-scale images attractively. Much of the improvement is a result of new driver software.

Owners of the original StyleWriter, naturally eager to gain some of the same improvements, have gotten mixed messages from Apple about using the new software with the older printer model.

At first, Apple help-line staffers recommended using the new driver with the older StyleWriter for the added benefits. But the company has not announced an official software upgrade, either free or priced.

Subsequent discussion on-line in ZiffNet/Mac indicated that Apple had not tested the new driver on the original StyleWriter and could not guarantee its proper operation. Problems may appear with one document and not with another in the same configuration.

As this was being written, Apple's help-line staffers had switched to recommending against using the new driver with the StyleWriter, and they had no upgrade path to offer StyleWriter owners who want the new functions.

Hands-on testing. Meanwhile, intrepid experimenters were trying out the unsupported combination of hardware and software to see how well it would work.

Dan Miller reported on ZiffNet/Mac having serious problems printing in background mode with the new driver handling his StyleWriter.

Another person reported that a StyleWriter II option, "Clean Ink Cartridge before printing," damaged his StyleWriter I cartridge, although Miller also tried the option and saw no problem. (Try disabling that option in the Print dialog by using a resource editor on the StyleWriter II driver if you want to create a safer version of the driver for the older StyleWriter.)

Despite these issues, Miller found that the new driver dramatically improved the appearance of a gray-scale photograph printed on his StyleWriter, producing strikingly better tonal gradations and much more clarity. (The gray-scale option was slow, however, taking several minutes for an image less than 4 by 6 inches in size.)

At this point, the extent of the compatibility problems between the StyleWriter II driver and the StyleWriter I isn't known, but it is clear that the older hardware is capable of much better printing than its officially supported driver provides.

It may be difficult for Apple to justify putting extra development into software for a printer it has dropped from its price list. But it would not be difficult to test the new driver on the StyleWriter I, document the incompatibilities and make the driver available "as is" to StyleWriter owners for whom the benefits outweigh the problems.

Floating processors. A new feature of the LC III is also causing some confusion among customers.

Unlike the LC II, the LC III provides a socket on its logic board to hold an optional FPU (floating-point unit). Since the computer also supports expansion cards through its processor direct slot, a variety of FPU configurations is possible.

There may be no FPU at all, an FPU only in the socket on the motherboard, an FPU only on the expansion card or FPUs in both locations.

Further complicating the issue, the LC III's slot can handle an older LC/LC II card or a more advanced LC III card. And the logic board runs at 25 MHz, but an expansion card may run at the 16-MHz speed of the older LC or at a faster speed.

Installing an FPU rated for 25 MHz or more on the logic board should be straightforward, updating the LC III to a IIci-style configuration. But installing an expansion card with an FPU has the potential for a variety of problems, particularly if the card is not an accelerator that takes over completely from the main CPU.

Reader Matt Strange encountered frequent, random crashes after installing Ethernet cards with FPUs in five LC III machines that had no FPUs on their logic boards. When Strange moved the FPUs from the cards to the logic boards the crashing stopped.

This procedure may work in some cases, but for reliable operation, an FPU should be moved to the LC III logic board only if it is rated at 25 MHz or more.

The best option is to check with the card manufacturer in advance about LC III and FPU compatibility before installing a card, although it may be a while before many third-party developers have completed LC III testing.

Adjustable software. Lonnie Abelbeck, author of the VersaTerm programs, found that Apple's Adjustable Keyboard does not identify itself through Apple's standard "Gestalt" mechanism, so he created a tiny extension to work around the problem. His Extended ADB Keyboard INIT is available from on-line services, including ZiffNet/Mac. □

Comments on MacInTouch are welcome at 7 Parmenter Ave., Maynard, Mass. 01754. Phone (508) 897-2621. Address electronic mail to RICFORD on AppleLink or MCI Mail; to 72511,44 on CompuServe; or on the Internet to 72511.44@compuserve.com. Join us on-line in the MacWEEK Forum at location ZMC:MACWEEK on CompuServe or ZiffNet/Mac.

Ask David Ramsey

Saving space on big disks



Q. I have a 500-Mbyte hard disk. Will files be stored more efficiently if I partition it?

A. Yes. The smallest amount of space the Mac's file system can use is called an allocation block. A Mac volume can have a maximum of 65,536 allocation blocks, and the smallest an allocation block can be is 512 bytes. Multiplying 65,536 by 512 gives 33,554,432 bytes or 32 Mbytes, which is the largest volume that can support the smallest allocation block size, if you follow me.

The Mac file system doubles allocation block size as volume size increases. A 500-Mbyte volume has a block size of 8 Kbytes. Only one file can be written to each block, so if a file is smaller than 8 Kbytes, the remaining space is wasted; the average amount of wasted space per file will be 4 Kbytes. If you partitioned your drive as two 250-Mbyte volumes, block size drops to 4 Kbytes and average wasted space per file to 2 Kbytes.

Some formatting utilities allow you to override the standard allocation block size and choose larger blocks. You lose in file "slop," but larger block sizes offer both better performance and slightly increased drive capacity (because of fewer inter-sector gaps).

Q. Will a NuBus card that works in one Mac work in any other Mac?

A. Not necessarily. There are three main considerations:

1. Is the card's ROM 32-bit-clean?
2. Does the card or its software depend on byte smearing?
3. Will the card physically fit?

The first condition is self-explanatory. The second is rather obscure; suffice it to say that cards that depend on byte smearing won't work in 68040-based Macs. (Apple's early video cards are an exception: They depend on byte smearing, but the Quadras detect these and patch their drivers out at start-up time. These same cards, however, won't work on Macs with 68040-based accelerators.)

The Quadra 900 and 950 can use special tall NuBus cards that wouldn't fit in other Macs (but nobody makes any I know of), and the Centris 610 is limited to NuBus cards no longer than 7 inches.

Please send questions to David Ramsey on CompuServe: 76702,335 or to Ask David Ramsey, c/o MacWEEK, 301 Howard St., 15th Floor, San Francisco, Calif. 94105.

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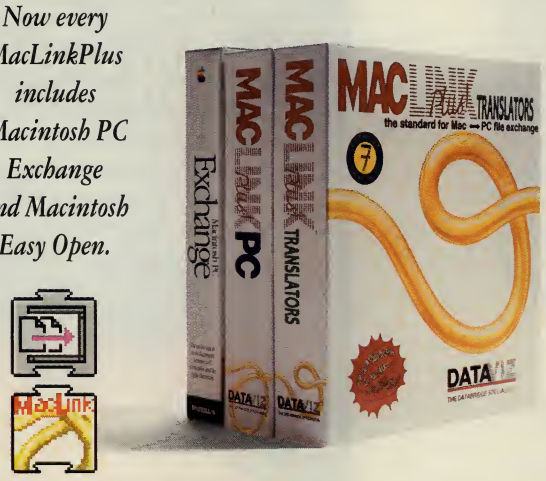
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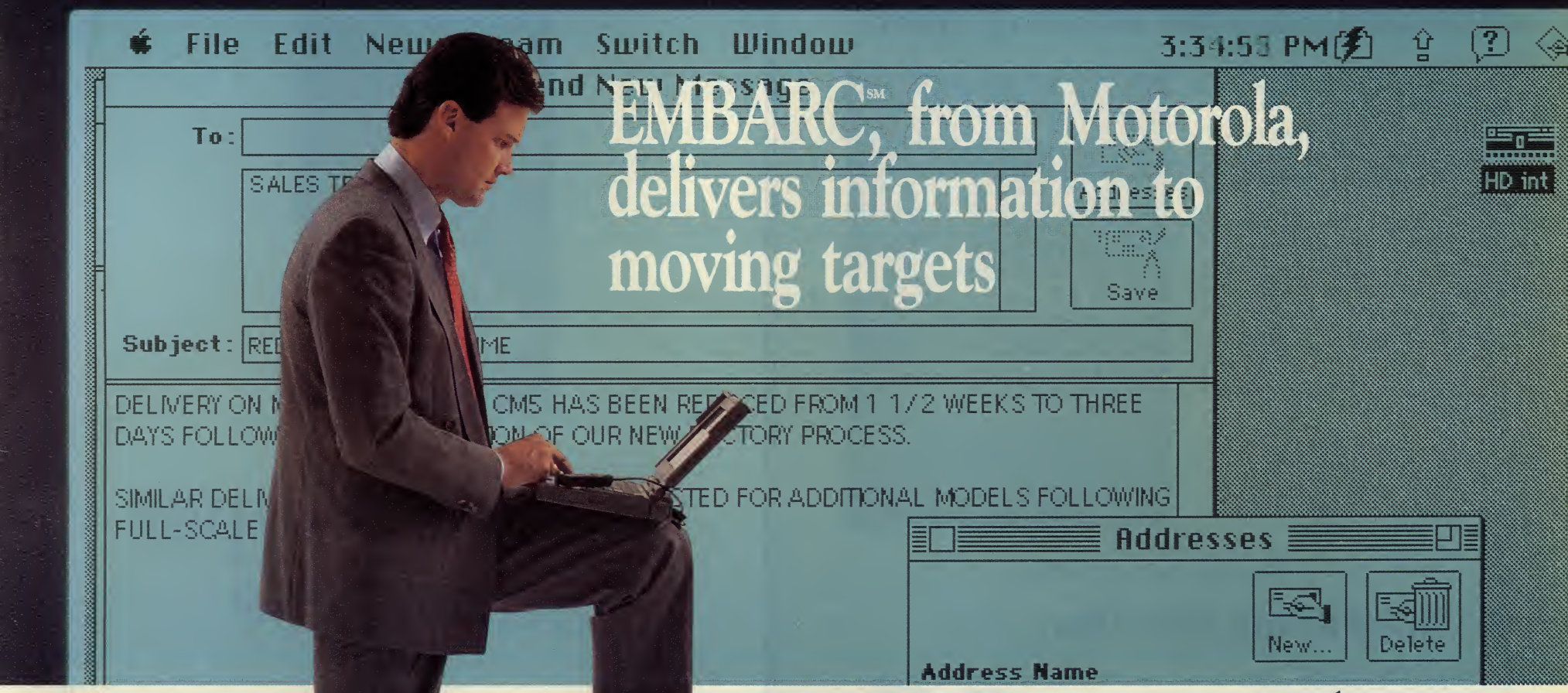
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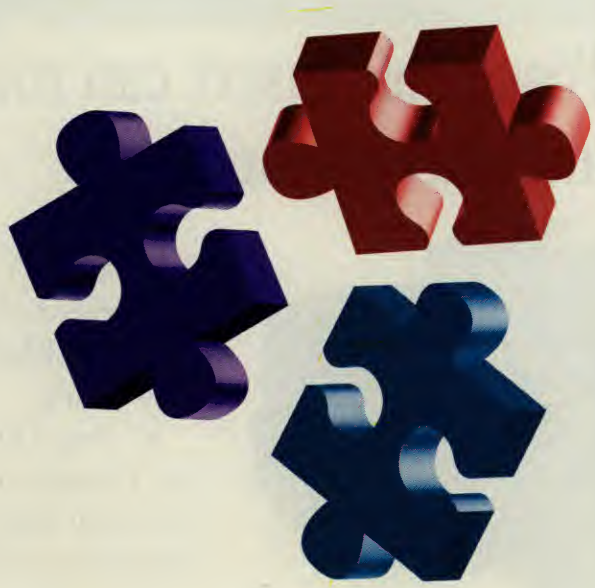
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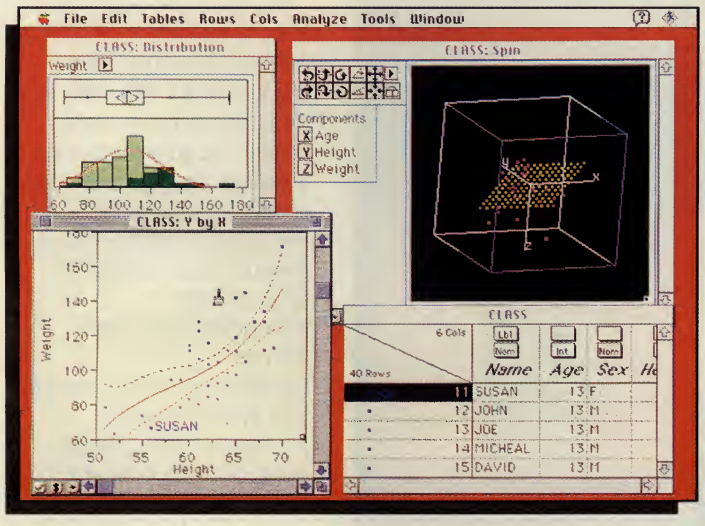
You can also purchase two PowerBook NiCd batteries from Lind for the same price. $89.00.

- Call: 1-800-659-5956 Visa and M/C accepted
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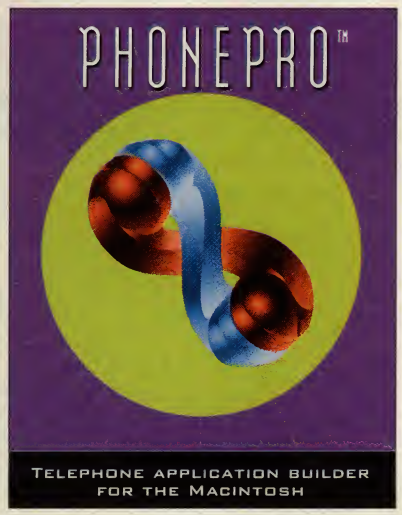
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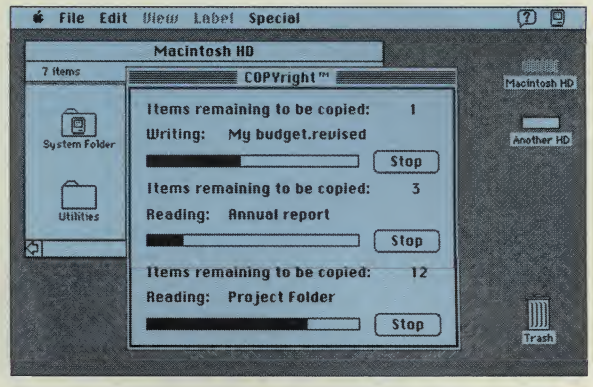
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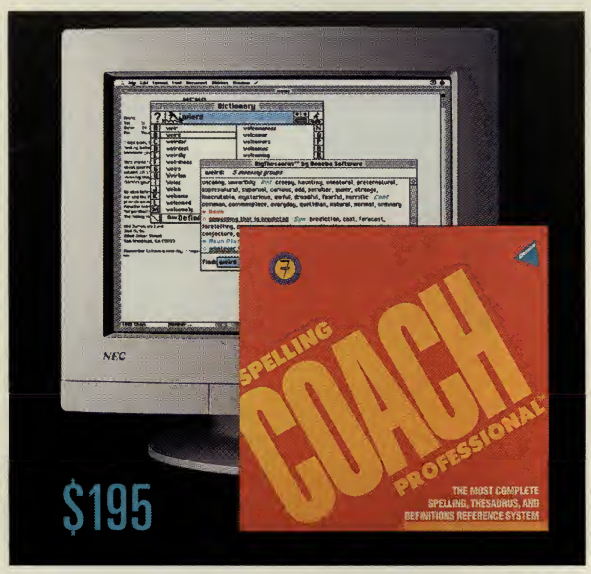
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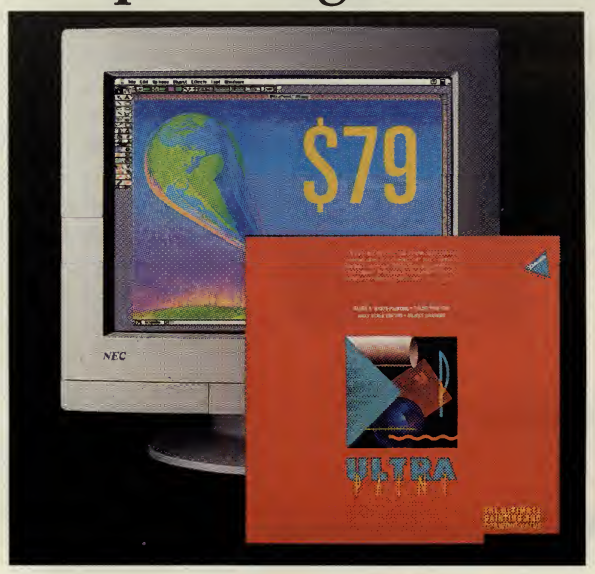


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Accelerate your PowerBook

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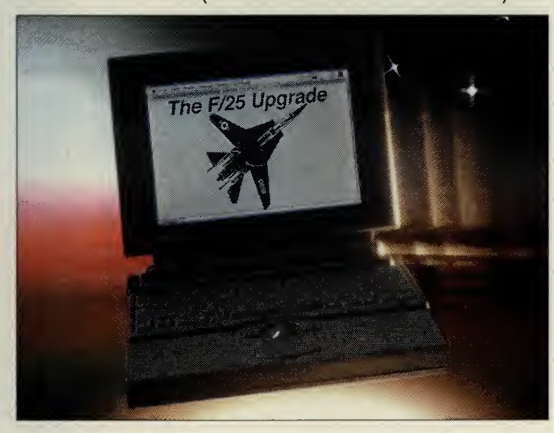
The F/25™ speeds up PowerBook 140s by 60% (to 25MHz) and includes a 68882 math co-processor. The F/25 effectively transforms a 140 into a 170 (without the active matrix screen).

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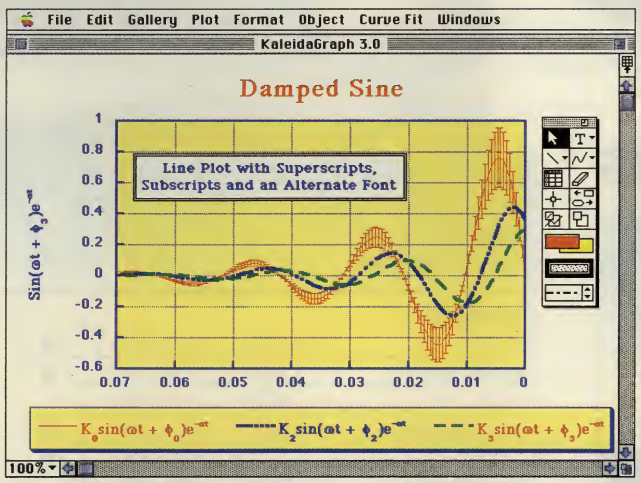
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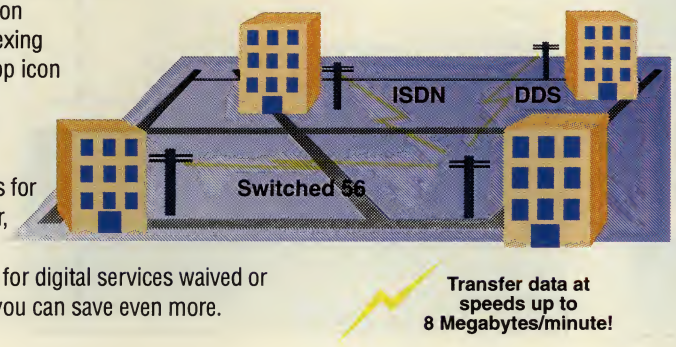
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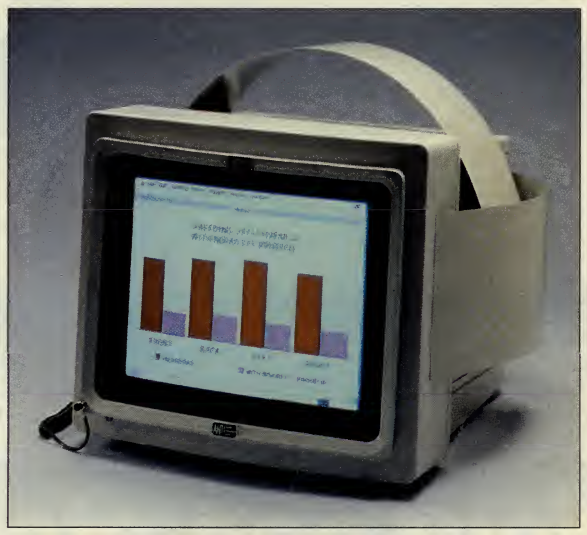
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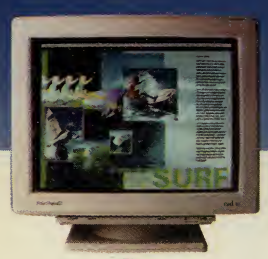
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G. Sony 17"	1,149	Trinitron	■		■	■		■	■
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L. Sigma 15" Grayscale (PageView GS)	579	Phillips		■					■
M. RealTech 15" Grayscale	449	—		■					■
Sigma 15" Grayscale (Power Portrait)	659	Phillips		■					■
NEC 15" 3FGX Color	669	NEC	■		■	■		■	
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Spectrum/8•24 PDQ	829	640 x 480	
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Thunder 24	2159	1152 x 870	■
ThunderLight	1669	1152 x 870	■
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Precision Color 24XK	829	1024 x 768	■
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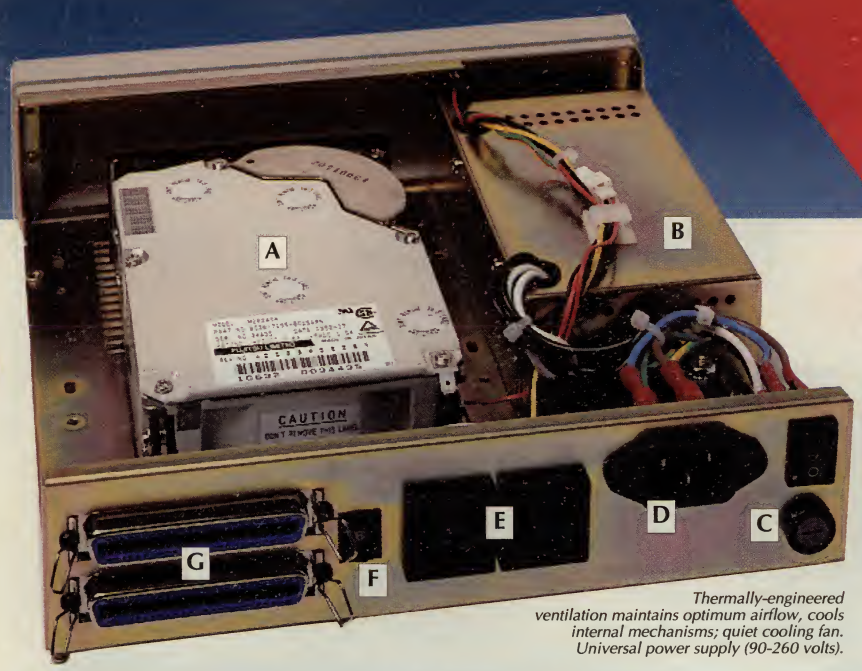
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Quantum 85	ELS85	205	275	82	17	1.4	LP	2
Conner 120	CP-30100	259	329	116	17	1.5	LP	1
Maxtor 120	7120XT	229	299	121	15	1.5	LP	2
120 - 250 MB								
Quantum 127	ELS127	$259	$329	124	17	1.4	LP	2
Conner 170	CP-30170E	289	359	160	9	1.5	LP	1
Quantum 170	ELS170	279	349	160	17	1.4	LP	2
Conner 212	CP-30200	369	439	206	12	2.5[1]	LP	1
Maxtor 213	7213	329	399	207	15	2.8	LP	2
Quantum 240	LPS240	369	439	234	10	1.4	LP	2
Maxtor 245	7245	359	429	245.6	15	3.0	LP	2
320 - 570 MB								
Maxtor 340	LXT-340	$599	$669	324	15	2.1[1]	HH	2
Fujitsu 520	M2624FA	899	969	496	9	2.7[1]	HH	5
Quantum 525	LPS525	929	999	500	10	3.2[1]	LP	2
Maxtor 540	MXT-540	969	1039	546	9	5.5[1]	HH	2
Conner 540	CP-3540	899	969	515	12	5.5[2]	HH	1
Micropolis 560	M2105	1069	1139	560	10	5.0[2]	HH	5
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Quantum 700	PRO700	$1249	$1319	700	10	2.9[1]	HH	2
Micropolis 800	M2108	1349	1419	698	10	5.0[1]	HH	5
Toshiba 877	MK-438FB	1099	1169	830	12.5	3.0[1]	HH	2
Quantum 1050	PRO1050	1419	1489	1000	10	2.9[1]	HH	2
HP 1050	97558	1649	1749	987	13.5	2.8[1]	FH	5
Fujitsu 1.2	M2266	1249	1349	1079	14.5	3.0[1]	FH	5
HP 1.2	C2247	1589	1659	1000	10.5	5.3[1]	HH	5
Micropolis 1.2	M2112	1449	1519	1005	10	5.0[1]	HH	5
Quantum 1.2	PRO1225	1599	1669	1200	10	2.9[1]	HH	2
Toshiba 1.2	MK-538FB	1399	1469	1200	12.5	4.0[1]	HH	3
Maxtor 1.2	MXT-1240	1549	1619	1240	9	4.5[1]	HH	3
Conner 1.3	CP-31370	2059	2129	1030	10.5	6.0[1]	HH	1
1.5 - 3.6 GB								
Micropolis 1.5	M1528	$2299	$2399	1341	14.5	2.9[1]	FH	5
Micropolis 1.6	M1548	2379	2479	1748	14	4.8[1]	FH	5
Fujitsu 2.0	M2652	2299	2399	1752	11	4.8[2]	FH	5
Seagate 2.1	ST42100N	1999	2099	1900	12.9	3.9[2]	FH	5
Fujitsu 2.4	M2654	2549	2649	2000	11	4.8[2]	FH	5
Micropolis 2.4	M1924	2649	2749	2100	11.5	4.5[2]	FH	5
Seagate 2.4	ST42400N	2879	2979	2050	11s	4.5[2]	FH	5
HP 2.4	C3010	2899	2999	2000	11.5	5.3[2]	FH	5
Seagate 3.4	ST43400N	3999	4099	2750	11	6.0[2]	FH	5
Micropolis 3.6	M1936	4199	4299	3022	12	6.0[2]	FH	5

* Transfer rate (or throughput) depends on your Mac CPU and system configuration. For more information, ask your Hardware That Fits sales partner. ***Form Factor* *Low Profile (LP)=3.5* *Half Height (HH)=3.5* *Full Height (FH)=5.25*

[1] SCSI-2 [2] SCSI-2 Fast ***These drives are most efficient when used with a Macintosh Quadra 800, 950 or a RealTech SCSI-2 card.***

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The RealTech DAT Drive uses industry-standard DDS-DC compression on a 90-meter tape. Depending on your data, storage capacities may vary from 2 to 8 GB.

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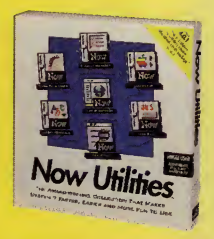
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Capacity (MB)	Model Number	Average Access Time (msec)	Transfer rate (K/sec)	MTBF (Hours)	MFG warranty (months)	Internal Drive Price	Zero Footprint Drive Price	Compact Drive Price
Connor								
85	CP-30080E	16	1300	150000	24	$199	$259	
120	CP-30100	16	1300	150000	24	$259	$309	
170	CP-30170E	16	1400	150000	24	$269	$329	
213	CP-30200	15	2000	150000	24	$349	$399	
Quantum								
85	ELS 85S	17	1800	250000	24	$199	$269	
127	ELS 127S	17	1800	250000	24	$229	$299	
170	ELS 170S	17	2000	250000	24	$259	$329	
240	LPS 240S	16	2300	250000	24	$329	$399	
80 (Pwrbk)	GO 120	17	1900	150000	12	$349		
Digital Equipment								
1.05GB	DSP-3105	9.5	2600	250000	60	$1,249	$1,299	$1,349
Seagate								
240 (PowerBook)	ST-9295N	16	2100	150000	12	$549		
1.05GB	ST-11200N	10.5	3200	200000	60	$999	$1,049	$1,099
Fujitsu								
520MB	M2624FA	9	2700	200000	60	$799	$859	$899
1.06GB	M2694FA	9	2800	200000	60	$1,399	$1,449	$1,499

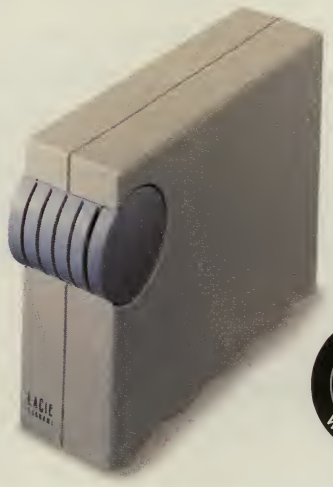
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127MB (3½")	$249	$309	$369
170MB (3½")	$269	$329	$389
240MB (3½")	$359	$419	$479
525MB (3½")	$889	$949	$1009
700MB (3½")	$1179	$1239	$1299
1.05GB (3½")	$1319	$1379	$1439
1.2GB (3½")	$1479	$1539	$1599
80MB (2½") for Powerbook	$299	See PocketDrive	
120MB (2½") for Powerbook	$359	See PocketDrive	
160MB (2½") for Powerbook	$499	See PocketDrive	

Seagate	Internal	ZFP+
1.6GB (5¼")	$1749	$1899
2.1GB (5¼")	$1849	$1999
2.4GB (5¼")	$2689	$2839

HP	Internal	ZFP+
1.6GB (5¼")	$2459	$2609



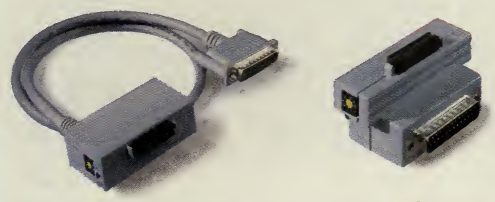
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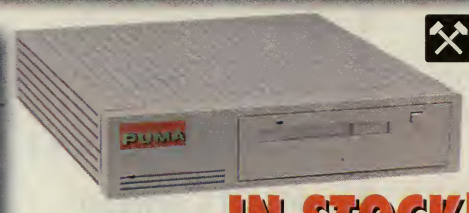
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"Fast, inexpensive, good technical support, easy to use--this is a rare combination of qualities for a storage device." MacWorld 11/92

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Conner Drives

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C 85 MB	3.5" LPS, 2 yr warr,150,000 MTBF	$198	$258
C 120 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$248	$308
C 170 MB	3.5" LPS, 2 yr warr, 150,000 MTBF	$278	$338
C 212 MB	3.5" LPS, 9ms, 2 yr warr, 150,000 MTBF, Fast SCSI	$358	$418
C 540 MB	3.5" 8.5 ms, 2 yr Warr,150,000 MTBF, Fast SCSI	$898	$958

These new Conner drives are so reliable, that Conner has been one of Apples largest suppliers of drives. The 150,000 hours Mean Time Between Failure and the incredible speed of the 540 are just two reasons to buy a Conner.

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1.1 Gig	3.5" 8.5ms, 5yr warr, 300,000 MTBF, Fast SCSI	$1598	$1658
1.2 Gig	5.25" 11.5ms, 5yr warr, (MacWorlds Fastest Gig!) Fast SCSI	$1288	$1388
2.06 Gig	5.25" 11.5ms, 5yr warr, 300,000 MTBF, Fast SCSI	$2288	$2388
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*Mean Time Between Failure is the average life expectancy of a drive.

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2.1 Gig Wren 9	5.25" 12.5ms, 5 Yr warranty	$1898	$1998
1.6 Gig Elite 1	5.25" 11.5ms, 1 Yr warranty	$1848	$1948
2.4 Gig Elite 2	5.25" 11ms, 5 Yr warranty	$2548	$2648
3.4 Gig Elite 3	5.25" 11ms, 5 Yr warranty	$3428	$3528

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Toshiba 3401 "Kodak photo CD" Multisession, 200ms access time, ...$498

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No charge, Visa or Mastercard, Amex accepted, COD, Telecheck Approved Checks, Gov., Corp., Univ., P.O.s welcome. All new drives, preformatted with latest stable system software. Factory warranty. Bracket, cables and software included. 30 Day Money back Guarantee covers drive products only. Return Authorization number required for returns. Prices, terms and availability subject to change without notice.

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Technical Support (8:30-5:00) 800-759-2133

Hey" MacDirect Now sells Simms, Call for our low prices!

MONITOR SPECIAL!
SAMPO 20" Color System
998.00
While Supplies Last

Sampo 20"

8 Bit Color System.....$998.00
Mono System.....$698.00
Grey Scale System.....$998.00

- The SAMPO is a high quality display without the high cost!
- Includes 1 bit, or 8 bit Bit Video board and cable
- Display supports all Mac's
- Resolution 1024 x 768 at 72 DPI

Trinitron 20" Color System

Monitor Only for Quadra & Centris.....$1898.00
8 and 24 bit RasterOps interface available Call

- The Trinitron-20 is a 20" monitor incorporating Sony's patented technology and one of our best buys! True Trinitron color at a great price!
- Display supports all Mac's

Get the Big Picture with MacDirect Monitors



16" SONY Trinitron
$1098

- Plug compatible Quadra, Centris
- Plug compatible SI, CI, LC's at 640x480



NuDesign Full Page Display
$398

- Plug compatible with SI,CI, LC III, Centris 610 & 650 and Quadra's
- 1 Bit System available for all macs 488.00

NuDesign Full Page Grey Scale$398.00
With 1 Bit Interface Card$488.00

- Plug compatible with Si, Ci, LC III, Centris 610 & 650 and Quadra (16 levels of Grey).
- 1 Bit System available for all macs

MODEMS FROM MACDIRECT

Prometheus Modems		*Zoom Modems*	
Pro Ultima Home Office	$408	Zoom Faxmodem PBK	$129
Promodem 144i	$288	Zoom Faxmodem PKT Portable	$149
Promodem 144e	$288		
Promodem 24e	$138	Zoom Faxmodem FXV	$188
Promodem Mini 2400	$89	Zoom Faxmodem FXV.32	$308

SAMSUNG 1200 DPI PRINTER

SAMSUNG 300 dpi Printer$1298.00
1200 DPI Upgrade *(Available in May)*.....$998.00

- Incredible 1200 dpi upgradeability allows for future growth
- SAMSUNG is one of the worlds largest electronics companies!
- IncludesPostScript and PCL-5 compatibility
- Intensly fast Intel i960 RISC processor

Call About Simms!

Model	60 NS	70 NS	80 NS
1x8	Call	Call	$33
2x8	Call	Call	$63
4x8	Call	Call	$133
8x8	Call	Call	$279
16x8 FX	Call	Call	$549
16x8 Q950	Call	Call	$515

Memory for LCIII, Centris 610, 650
4mb....Call 8mb.....Call
16mb Call

We carry most Mac Memory, Please Call for prices!

UMAX Color Scanners

Umax UC-630 With *PhotoShop 2.5*.....$1098.00
Umax UC-840 With *PhotoShop 2.5*.....$1298.00
Transparency/Slide Scanner Option.....$728.00
Automatic Document Feeder$498.00

- Rated four mice by MacUser (Dec '91)
- Rated fastest by MacUser(Dec '91)
- "Boasts the highest vertical resolution..."Umax produced the best images..." excel(s) in speed and color accuracy" MacUser

Umax UC-1200S With *PhotoShop* 2.5 CALL
Transparency/Slide Scanner Option.....$798.00

- Sncredible 1200 dpi scanning res. recognizes 1 billion colors internally
- Single-pass design increases scanning speed
- Includes Adobe Photoshop 2.5

Umax 600DPI Greyscale With *Typereader OCR Software, Ofoto and Publish It,*$898.00

- **An incredible OCR package with over $1000 in software alone,**



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Quantum



Unformatted Capacity	Model	Access Time	Actual MAC Capacity	Internal	External
GO•DRIVE (2.5" HARD DRIVES DESIGNED FOR POWERBOOKS)					
80mb	GO80	17ms	80mb	$289	$389
120mb	GO120	17ms	120mb	$339	$439
ELS SERIES (3.5" LOW PROFILE AND LOW POWER)					
42mb	ELS42	19ms	40mb	$169	$229
85mb	ELS85	17ms	82mb	$195	$255
127mb	ELS127	17ms	124mb	$229	$289
170mb	ELS170	17ms	160mb	$259	$319
LPS SERIES (3.5" LOW PROFILE)					
105mb	LPS105	11ms	100mb	$215	$275
120mb	LPS120	10ms	116mb	$269	$329
240mb	LPS240	10ms	234mb	$339	$399
525mb	LPS525	10ms	500mb	$869	$929
PRODRIVE SERIES (3.5" HALF HEIGHT)					
BEST BUY 425mb	PRO425	9ms	406mb	$739	$799
700mb	PRO700	10ms	670mb	$1099	$1159
1.0GIG	PRO1050	10ms	1001mb	$1219	$1279
1.2GIG	PRO1225	10ms	1165mb	$1359	$1419

GO•Drives carry a ONE Year Warranty. ELS drives, LPS drives, PRO drives carry a TWO Year Warranty.

Maxtor

*6300 RPM



Unformatted Capacity	Model	Access Time	Actual MAC Capacity	Internal	External
XT SERIES (3.5" LOW PROFILE)					
120mb	7120S	15ms	121mb	$209	$269
207mb	7213S	15ms	202mb	$299	$359
LXT & MXT SERIES (3.5" HALF HEIGHT)					
FAST!! 340mb	LXT-340	15ms	324mb	$569	$629
FAST!! 540mb*	MXT-540	8.5ms	521mb	$899	$959
1240mb*	MXT-1240	8.5ms	1150mb	$1449	$1509
PANTHER SERIES (5.25" FULL HEIGHT)					
1.2GIG	PO-12S	13ms	997mb	$1199	$1299
1.7GIG	P1-17S	13ms	1433mb	$1449	$1549

Maxtor drives carry a TWO Year Warranty.

TOSHIBA

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
NEW! 213mb	MK2224FB	2.5" Low Profile	12ms	207mb	$589	$689
1230mb	MK538FB	3.5" Half Height	12ms	1185mb	$1339	$1439

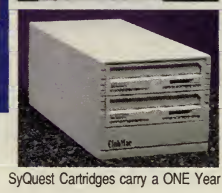
Toshiba drive carries a ONE Year Warranty.

IN STOCK!! NEW CLUBMAC 3.5" 105MB REMOVABLE



FEATURING SyQuest® REMOVABLE TECHNOLOGY





SyQuest Drives include TWO Year Warranty, one cartridge and necessary cables, SCSI Director™ Formatting Utility. Warranty.

SyQuest Cartridges carry a ONE Year

CLUBMAC 3.5" 105MB REMOVABLES	
ClubMac 105mb External (SQ3105A)	$749
ClubMac 105mb Internal (Q900/950)	$719
CLUBMAC 88c REMOVABLES*	
ClubMac 88c External (SQ5110C)	$555
ClubMac 88c Internal	$549
ClubMac 88c Dual	$1045
CLUBMAC 44MB REMOVABLES	
ClubMac 44mb External (SQ555)	$378
ClubMac 44mb Internal	$355
ClubMac 44mb Dual	$695
CLUBMAC 88MB REMOVABLES	
ClubMac 88mb External (SQ5110)	$479
ClubMac 88mb Internal	$459
ClubMac 88mb Dual	$875
SYQUEST CARTRIDGES	
105mb Cartridge	$79
44mb Cartridge	$63
88mb Cartridge	$97

* ClubMac 88c will read and write 44mb cartridges, but will not format 44mb cartridges.



Seagate

FEATURING...THE ELITE DRIVES

Unformatted Capacity	Model	Description	Access Time	Actual MAC Capacity	Internal	External
3.5" DISK DRIVES						
248mb	ST3283N	Low Profile	12ms	235mb	$365	$425
1.2GIG	ST11200N	Half Height	10.5ms	1000mb	$1149	$1209
WREN AND ELITE SERIES (5.25" FULL HEIGHT)						
645mb	ST4767N	Wren Runner II	11.9ms	634mb	$1069	$1169
1.2GIG	ST41200N	Wren-7	15ms	989mb	$1149	$1249
1.6GIG	ST41651N	Wren-8	15ms	1350mb	$1349	$1449
2.1GIG	ST42100N	Wren-9	12.9ms	1900mb	$1725	$1825
1.6GIG	ST41600N	Elite-1	11.5ms	1307mb	$1825	$1925
2.4GIG	ST42400N	Elite-2	11ms	2050mb	$2449	$2549
3.4GIG	ST43400N	Elite-3	11ms	2750mb	$3149	$3249

Seagate drives carry a ONE Year Warranty.



ClubMac TAPE BACKUP Systems

TAPE BACKUP MEDIA	
60 METER DAT	$13
90 METER DAT	$16
CT600N	$19
CT600F	$28
EXABYTE 8MM	$18

NOW SHIPPING WITH RETROSPECT V2.0 BACKUP SOFTWARE

Capacity	Model	Description	Media	Internal	External
155mb	Teac MT2ST/N50	Analog	CT600N	$429	$449
600mb	Teac MT2ST/F50	Analog	CT600F	$629	$649
500mb	Archive Vipor 500	Analog	DL6250	$679	$699
2.0GIG	Archive Python	DAT, DDS	4mm	$1049	$1069
3-5GIG	Archive Turbo DAT	DAT, DDS-DC	4mm	$1329	$1349
2.0GIG	WangDAT 1300XL	DAT, DDS	4mm	$1049	$1069
3-5GIG	WangDAT 3200	DAT, DDS-DC	4mm	$1339	$1359
2.0GIG	Hewlett Packard 35470A	DAT, DDS	4mm	$1269	$1289
3-5GIG	Hewlett Packard 35480A	DAT, DDS-DC	4mm	$1429	$1449
2-5GIG	Exabyte 8205	Helical/Compression	8mm	$1709	$1729
5-10GIG	Exabyte 8505	Helical/Compression	8mm	$2649	$2669

Includes RetroSpect v.2.0 Backup Software, One Tape and ONE Year Warranty

ClubMac OPTICAL Drives

SHARP INTERNAL OPTICAL IS PERFECT FOR THE MAC IIVX, CENTRIS 650 & Q 900/950



Model		Capacity	Description	Seek	Internal	External
CMO-M2511A	Fujitsu	128mb	3.5" Low Profile	35ms	$959	$999
CMO-OD3000	Teac	128mb	3.5" Half Height	45ms	$939	$979
CMO-3100E	Ricoh	128mb	3.5" Half Height	45ms	$1035	$1075
CMO-JY750	Sharp	594/652mb	5.25" Half Height	40ms	$2255	$2295
CMO-5031E	Ricoh	594/652mb	5.25" Full Height	28ms		$2345
CMO-Tahiti II	MaxOptix	650mb/1.0GIG	5.25" Full Height	35ms		$3195
128mb Cartridge		3.5" Single Sided				$39
594/652mb Cartridge		5.25"-512/1024 bytes/sec				$95

All ClubMac Opticals include ONE cartridge and ONE Year Warranty.

ACCELERATORS

DAYSTAR DIGITAL

30 DAY MONEY BACK GUARANTEE

POWERCACHE

NEW 25 MHZ TURBO 040 $1079
33 MHZ TURBO 040 $1329
NEW FASTCACHE FOR TURBO 040 (25 MHZ)$249
FASTCACHE FOR TURBO 040 (33 MHZ)$335
CHARGER FOR PHOTOSHOP $789

COMPATIBLE WITH CLASSIC, SE, LC, SE/30, II, IIX, IICX, IISI, IICI, PERFORMA
*POWERCACHE ADAPTER NOT INCLUDED

	W/O FPU	W/ FPU
33 MHZ POWERCACHE*	$375	$459
40 MHZ POWERCACHE*	$545	$635
50 MHZ POWERCACHE*	$715	$845
EQUALIZER LC	$169	$239
POWERCACHE ADAPTER	$41	

CACHE CARDS

FASTCACHE IISI / IISI WITH FPU.....$279/349
FASTCACHE IICI.....$199
FASTCACHE QUADRA - Q700/900$249
FASTCACHE QUADRA - Q700/900/950$375

EXPANSION BOARDS

DUALPORT IISI/ POWERMATH LC.....$165 /115

RADIUS



ROCKET 33 $1699

- NuBus-based processor, powered by the 33MHz Motorola 68040
- Increases processing speed of the original Mac up to 8 times even exceeding Quadra performance in most cases

NEW! LOW PRICE

ROCKET 25i $979
SCSI-2 BOOSTER..... $249
ROCKETSHARE..... $399

SUPERMAC

THUNDERSTORM PRO..... $2779
THUNDERSTORM DELUXE..... $869
THUNDERSTORM $599

FAX MODEMS

GLOBAL VILLAGE

POWERPORT (INTERNAL POWERBOOK FAX/MODEMS)

BRONZE (24/96 S/R FAX MODEM) $179
SILVER (96/96 S/R FAX MODEM) $359
GOLD (14,400 S/R FAX MODEM) $419

TELEPORT (EXTERNAL DESKTOP FAX/MODEMS)

BRONZE (24/96 S/R FAX MODEM) $189
SILVER (96/96 S/R FAX MODEM) $359
GOLD (14,400 S/R FAX MODEM) $419

PSI

POWERMODEM I / II $139 / 225
POWERMODEM III / IV..... $369 / 439
COMSTATION I / COMSTATION V$135 / 429
COMSTATION NETWORK (WITH SW)$CALL

PIICEON

14.4 INTERNAL PWRBK FAX MODEM$289

SUPRA TECHNOLOGY

SUPRAFAXMODEM V.32 WITH SOFTWARE$289
SUPRAFAXMODEM V.32 STANDALONE$239
SUPRAFAXMODEM 14.4 V.32 BIS WITH SW$349
SUPRAFAXMODEM 14.4 V.32 BIS STANDALONE$299



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The Intelligent Choice in Data Communications

mac&fax $249

- 14,400 send & receive data & fax modem
- Includes MicroPhone LT & FAX*stf* software

MISCELLANEOUS

IOMEGA

BERNOULLI TRANSPORTABLE
90MB / 150MB.....$499 / 785
TRIPAK CARTRIDGES
90MB / 150MB.....$395 / 385



Bernoulli Transportables incl. one cartridge, cables, software, FIVE Year Warranty.

PHONENET CONNECTOR..... $14
CLUBMAC EXTENDED KEYBOARD..... $79
EXT. HALF HT CABINET WITH CABLES..... $75
EXT. FULL HT CABINET WITH CABLES.....$125
EXT. DUO BAY WITH CABLES..... $125
EXT. 2.5" ENCLOSURE WITH CABLES..... $99
HARD DRIVE BRACKETS..... $19
25-50 OR 50-50 SCSI CABLE..... $10
HDI 30 - 50 PIN CABLE..... $35
HDI 30 - DB 25 CABLE..... $30
EXTERNAL TERMINATOR..... $7.50

MEMORY

MEMORY PRICES CHANGE FREQUENTLY, CALL FOR CURRENT PRICES

STANDARD MAC

1MB / 2MB X 8 $32 / 65
4MB X 8 / 4MB WITH PAL..... $126 / 145
8MB / 16MB X 8 $289 / 552

MAC IIFX

1MB / 4MB / 8MB X 8..... $37 / 130 / 553

CENTRIS 610/650/LCIII

4MB / 8MB / 16MB..... $132 / 271 / 542

DUO 210/230

4MB / 8 MB $223 / 345

POWERBOOK 140/145/170

4MB / 6MB $161 / 218

POWERBOOK 160/180

4MB / 6MB $173 / 248
8MB / 10MB $335 / 415

QUADRA 700

8MB / 16MB LOW PROFILE..... $329 / 576

QUADRA 800

4MB / 8MB / 16MB..... $171 / 306 / 715

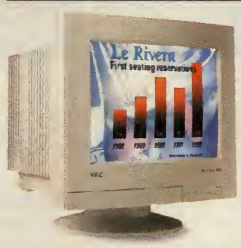
QUADRA 950

16MB..... $583

VIDEO RAM

256K VRAM FOR QUADRAS..... $23
512K VRAM FOR LC, LCII, IIVX..... $46

MONITORS & CARDS



NEC

CASH $100 REBATE

GET A $100 REBATE WHEN YOU BUY THE NEC MACFG 24XP COLOR DISPLAY INTERFACE CARD AND A 15" OR 17" MULTISYNC FG COLOR MONITOR.

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NEW 17" MULTISYNC 5FGe (IN STOCK) $1139
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MACFG 8X / 24Xp / 24X.....$639/495/1199

RADIUS

MONITORS

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INTELLICOLOR DISPLAY/20..... $2656
PRECISIONCOLOR PIVOT..... $935
PRECISIONCOLOR/19 $2029
FULL PG DISPLAY/MONO PIVOT.....$569/689
2-PG DISPLAY19 / 21 / 21E....$875/1139/1299

VIDEO CARDS

PRECISIONCOLOR 8XJ / 24X.....$489 / 1499
PRECISIONCOLOR 24XP / 24XK....$489 / 815
UNIVERSALCOLOR 24 SM / LG.....$499 / 839
COLOR PIVOT / MONO PIVOT$499 / 249
2-PG / FULL PG DISPLAY$375 / 189

RASTEROPS

MONITORS

21" COLOR (2168)..... $2519
20 MULTIMODE COLOR (2085H)..... $1299
20T MULTISCAN TRINITRON (2075RO)....$2215
21" MONO/GS (2110)..... $999
15" MONO/GS PORTRAIT (1510)..... $499

VIDEO CARDS

RASTEROPS 24XLI / 24SX$1889 / 619
PAINTBOARD 24 / LI..... $1399 / 815

SUPERMAC

MONITORS

SUPERMATCH 20" / 21" COLOR.....$1519/ 2435
SUPERMATCH 20T MULTIMODE XL.....$2599
SUPERMATCH 17T$1069

VIDEO CARDS

THUNDER 8 / 24$1129 / 2259
THUNDER LIGHT..... $1739
SPECTRUM 24 SERIES IV..... $825

SUPERMAC/E-MACHINES

MONITORS

COLORPAGE T16 II..... $1299
E-MACHINES T-20XL $2519

VIDEO CARDS

FUTURA SX/MX/LX.....$469/819/1039

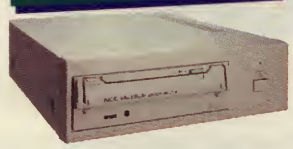
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MULTIMEDIA & CD-ROMS

KODAK'S MULTISESSION PHOTO CD COMPLIANT

NEC



MULTISPIN CDR-74

- 280ms access times
- SCSI-2 compatible
- 256k cache
- MultiSpin Technology
- TWO Year Warranty

NEC MULTISPIN CDR-74..... $619
NEC CD EXPRESS...FREE CD OFFER!!.. $349
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RASTEROPS 24XLTV..... $2639
MEDIATIME..... $1499
VIDEOTIME..... $1135
MOVIEPAK..... $1499
RASTEROPS 24STV..... $729
PHOTOPRO NUBUS..... $589
VIDEO EXPANDER NTSC..... $529

SUPERMAC

PHOTOSPEED $3299
VIDEOSPIGOT NUBUS*..... $369
VIDEOSPIGOT IISI* / LC.....$299/245
VIDEOSPIGOT PRO NUBUS**..... $1039
VIDEOSPIGOT PRO IISI**..... $1039
SPIGOT & SOUND / PRO **.....$499/1125

* FREE ADOBE PREMIERE 2.0 LE ** FREE ADOBE PREMIERE 2.0 FULL VERSION

TOSHIBA

TOSHIBA CD ROM..... $719

NETWORKING

ASANTE

MAC SE (68000 PDS)

THK/THN/10BT, 32K..... $199
THK/10BT, 32K..... $149

SCSI PRODUCTS

10BT, INCL SCSI CABLE..... $239
SCSI CABLE-HPDI30 & DB25 FOR PWRBK..$45

FRIENDLYNET ADAPTERS

THN FRIENDLYNET MEDIA ADAPTER..... $79
THK FRIENDLYNET MEDIA ADAPTER..... $79
10BT FRIENDLYNET MEDIA ADAPTER..... $79

10BASET HUBS

10BT HUB W/12 10T, THK&THN PORT..... $479
12-PORT SMART HUB W/SMNP H/W $899

ETHERTALK TO LOCALTALK

ASANTEPRINT, THK/THN..... $319
ASANTEPRINT, THK/10BT..... $319

MAC II FAMILY, PERFORMA 600 (NUBUS)

THK/THN/10BT, 64K..... $199
THK/THN, 64K..... $149
THK/10T, 64K..... $149

MAC IISI & SE/30 (030 PDS)

THK/THN/10T, 64K, FPU SOCKET..... $199
THK/THN, 64K, FPU SOCKET..... $149
THK/THN, 64K, FPU CHIP $245

LC, LCII & PERFORMA 400 (020, 030 PDS)

THN/10BT, FPU SOCKET..... $199
10T, FPU SOCKET..... $149
10BT, FPU CHIP..... $245

CLUBMAC

14-PORT 10BT HUB WITH AUI/BNC$395
9-PORT 10BT HUB..... $195
10BT EZ-NET (QUADRAS, LASERWRITER IIG).....$66
THK/THN/10BT, 64K (NUBUS)$129

PRINTERS

GCC

PLP II..... $799
BLP ELITE (4 PPM) $1149
WIDEWRITER 360 $1429
WRITE MOVE II $479
WRITE IMPACT (24-PIN)..... $499

NEC



NEW LOWER PRICES

$250 REBATE FROM NEC

SILENTWRITER 95F..... $989 *
SILENTWRITER 97 $1209 *
SILENTWRITER 95FX (BUILT-IN PS FAX) $1249 *
SILENTWRITER 97FX (BUILT-IN PS FAX) $1479 *

* AFTER MANUFACTURER'S $250.00 REBATE, OFFER ENDS 06/30/93



ADOBE PHOTOSHOP INCLUDED

HEWLETT PACKARD
Authorized Scanner Dealer

HP SCANJET IIC COLOR SCANNER.....$1295
- 400 DPI (800 DPI VIA INTERPOLATION) SINGLE PASS SCANNING
- COLORSYNC COMPLIANT • ENHANCED DESKSCAN II SOFTWARE
- BUNDLED WITH ADOBE PHOTOSHOP LIMITED EDITION

HP SCANJET IIP GS SCANNER$695
- 300 DPI (600 DPI VIA INTERPOLATION) SINGLE PASS SCANNING
- COLORSYNC COMPLIANT • ENHANCED DESKSCAN II SOFTWARE

HEWLETT PACKARD SCANNER OPTIONS

AUTO DOC FEEDER FOR HP SJ IIC$499
AUTO DOC FEEDER FOR HP SJIIP.....$279
ScanTastic ps (ADOBE PHOTOSHOP PLUG-IN) ..$69

SCANNERS

EPSON



ES-800C COLOR SCANNER..... $1399
ES-800C (SOFTWARE NOT INCLUDED)..... $1119
ES-600C COLOR SCANNER..... $1149
ES-600C (SOFTWARE NOT INCLUDED)..... $859
AUTOMATIC DOCUMENT FEEDER $465
TRANSPARENCY UNIT $765
ScanTastic ps (ADOBE PHOTOSHOP PLUG-IN) $69

MICROTEK

SCANMAKER II WITH PHOTOSHOP LE..... $885
SCANMAKER IIXE WITH FULL PHOTOSHOP....$1179
AUTOMATIC DOCUMENT FEEDER..... $479

WARRANTIES: All items manufactured by ClubMac are returned to ClubMac for warranty repair. All other items carry manufacturer's warranty. MONEY BACK GUARANTEE: All products manufactured by ClubMac carry a 30 day money back guarantee. ClubMac extends all other manufacturers' return policies to its customers.Non-ClubMac products carry 30 day money back guarantee when specified. RETURNS: Call for RMA number! Any product that is returned WITHOUT an RMA number will be refused. ALL PRODUCT INFORMATION AND PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE. NOT RESPONSIBLE FOR TYPOGRAPHICAL ERRORS.

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Sales, Info, International (714)768-8130
Technical Support (714)768-1490
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SYEX Express can provide network consultation at no charge. Simply fax your network needs and a list of your systems, including hosts, to SYEX Express (713) 956-5741, and our systems engineers will fax back a networking solution that fits your needs—all at no charge.

Accelerators

DAYSTAR DIGITAL

33 MHz Turbo 040 **$1349**
FastCache Turbo 33 **$349**
50 MHz PowerCache with 68882 **$849**
PowerCache Adapters **$40**
FastCache Quadra 700, 900, 950 (128K) **$399**

NEW LOWER PRICE

radius™

Radius Rocket 33™ **$1499**

Storage Devices

SONY®

128MB Magneto Optical Disk Drive
RMO-S350 3.5" with Mac kit **$1489**

650MB Magneto Optical Disk Drive
RMO-S550 5.25" with Mac kit **$2429**

128MB Optical Cartridge. **$59**
650MB Optical Cartridge. **$139**

NEC **CD-ROM Drives**

CDR-25 Express™ Bundle. . $399
CDR-25 with 1 pair amplified stereo speakers, stereo headphones, and 10 new CD titles.

CDR-74-1 **$599**
Kodak compatible, multi-spin

CDR-74 with CD Gallery. $799
CDR-74 with CD Gallery includes 1 pair amplified stereo speakers, headphones, and 6 CD titles.

Removable Cartridges

SyQuest® 45MB. **$65**
88MB. **$105**

Look! Mac IIci Cache Card with 32K sRAM only **$49** with any purchase

Timbuktu® Mac User **$49**

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PhoneNET® Ethernet Cards Mac User **$79**
10BaseT Nubus or SE/30

EtherMac™ II 10T **$139**
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PowerPath **$69**

LocalPath **$129**
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NEC

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MultiSync 3FGx™ (MacUser) **$599**
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MultiSync 6FG™ (MacUser) **$2299**
Large 21", .28mm dot pitch, 135MHz, 1024x768 non-interlaced

$100 Rebate Get a $100 rebate from NEC when you purchase a MacFG 24Xp card with either a 15" or 17" MultiSync FG monitor. Offer ends June 30, 1993.

NEC MacFG24xp card. **$549**
24-bit color NuBus card with QuickDraw acceleration

NEC MacFG8x card. **$639**
8-bit color NuBus card with QuickDraw™ acceleration

NEC MacFG24x card. **$1199**
24-bit color NuBus card with QuickDraw acceleration

SUPERMAC™

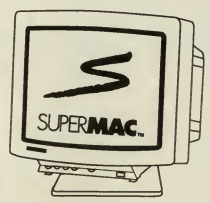
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SuperMacVideoSpigot Pro **$1039**
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Spectrum/8•24™ PDQ **$799**
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Low-cost large screen color display for business productivity. For Mac or PC.



SuperMatch 17•T Trinitron® Color $1049
1024x768 full-page. Compatible with Quadra built-in video.

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Radius Color Display/21™ $2199
21-inch color display for Macintosh (NuBus™) computers. Displays two facing pages in a resolution of 1152x870 at 75 Hz and 78 dpi.

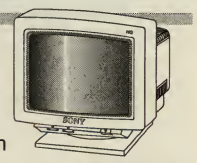
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19-inch, landscape, Two Page display display for Mac and PC computers. Mac resolution is 1152x 882 at 71Hz at 82 dpi.

Radius PrecisionColor Display/20S. $2329
20-inch multi-frequency Trinitron® color display for Macintosh and PC. "On-the-fly" resolution switching. Comes with PrecisionColor software

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Sony CPD-1604S $1049
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Flexible viewing, realistic colors for design and publishing

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LanRover/L is a dial-in server that provides PowerBook and Macintosh users with fast, easy, access to all network services.

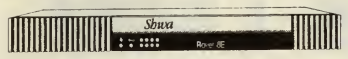
NetModem/E Thick, Thin or 10BaseT **$1379**
Shiva's multi-protocol, single-line remote networking server for AppleTalk and NetWare networks, includes a built-in V.32bis and V.42bis High-speed modem and Ethernet connector.

NetModem V.32 **$969**

FastPath 5R Router/Gateway **$1599**

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LanRover™/E



LanRover/E for NetWare is Shiva's high-performance, rack-mountable, multi-port remote networking server for Ethernet networks. LanRover/E allows you to dial into a network and access file servers, printers, e-mail, or network applications. LanRover/E can be managed from any computer, and attaches directly to thick, thin, or 10BaseT Ethernet.

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MacCon+IIE64 Thin or 10BaseT **$149**

MacCon3 NuBus or IIsi **$195**

MacCon+ 30IE64 Thin or 10BaseT **$149**

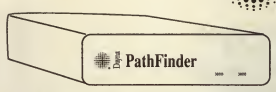
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10T Hub/8 **$239**

10T Hub/12 **$479**

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Dayna PathFinder .. **$549**
Dayna PathFinder™ makes LocalTalk to Ethernet routing easy & affordable. It has connectors for LocalTalk & all Ethernet cable systems, from thick and thin Ethernet to 10BaseT

SCSI/Link™ **$279**

DaynaPORT™ E/II-T **$149**

DaynaPORT Mini Hub/8 **$289**

EtherPrint-T **$329**

EtherPrint™ Plus **$419**

DaynaPORT E/II **$149**

DaynaPORT E/LC **$149**

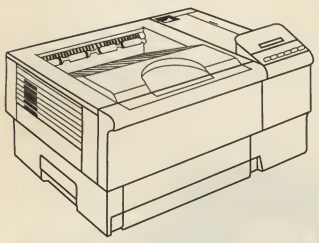
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$1369



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- 2MB RAM / 6ppm printing
- Automatically switches interface between Mac & DOS platforms
- 35 Adobe fonts / 14 HP fonts
- PostScript fax option included

Silentwriter Model 95f **$1199**
6 pages per minute; 2MB RAM; 35 Adobe fonts; 14 HP fonts. Automatically switches interface between Mac & DOS

Fax Upgrade for Model 95f **$489**

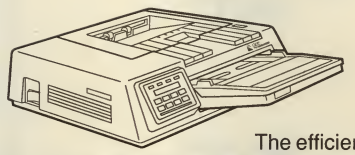
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Toner Cartridge for 95/97 **$165**

Silentwriter Model 97 **$1749**
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Silentwriter Model 97fx **$2199**
Same as Model 97; includes PostScript® Fax option

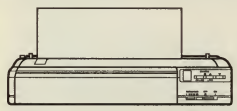
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GCC SelectPress™ 600 **$4149**
True 600x600 dpi, PostScript Level 2 compatible, 35 resident fonts; wide spectrum of paper sizes—A6 to tabloid. Edge-to-edge printing with full bleed capability on 11"x17". Automatically switches between Mac or PC. One year warranty.

Dataproducts®

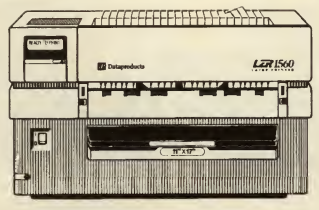
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Unsurpassed performance for Mac users. 300 dpi; 9 ppm printing; 2MB RAM; Adobe PostScript Level 2; 35 resident fonts

960 Toner Kit. **$49**

1560 Toner. **$249**

Complete line of Dataproducts peripherals & accessories available.

LZR 1560™
Ledger/A3 Laser Printer
$2999
with Two Trays



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New! **Suntouch Mac Extended Keyboard** **$89**
105-key enhanced keyboard layout featuring 15 function keys, separate numeric pad & cursor keypad, extra-large RETURN key, ergonomically angled, 1 year warranty.

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Supra Corporation®

SupraFAXModem™ 144PB. **$299**
For PowerBook models 100 through 180. 14,400 bps data and fax transmission.

Supra FAXModem V.32bis. **$349**
14,400 bps data and send/receive fax transmission. Includes FAXstf™, Microphone™ 1.6 software and cable.

Supra FAXModem+. **$179**

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UMAX®

MacUser

UMAX UC-630. .. **$1075**
600 dpi color with PhotoShop®

Transparency/Slide Adapter for UC-630 **$699**

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800 dpi color scanner with PhotoShop®

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E-MACHINES

PowerLink™ Presentor. **$429**
Connects Power-Book Duo to large screen displays, televisions, LCDs and projectors.

PowerLink DeskNet™ **$689**
The only desktop dock with full-speed Ethernet. Choose 10BaseT or Thin Ethernet.

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2MB SIMMs **$69**

4MB SIMMs **$129**

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8MB SIMMs for LC III, Centris **$299**

16MB SIMMs **$549**

16MB SIMMs for LC III, Centris **$599**

256K VRAM **$36**

4MB for PowerBook 160/180 **$239**

4MB for PowerBook Duo 210/230 ... **$239**

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8MB for PowerBook Duo 210/230 ... **$419**

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MODEMS

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MassMicro 650Mb $3,139.00
Cartridges available.

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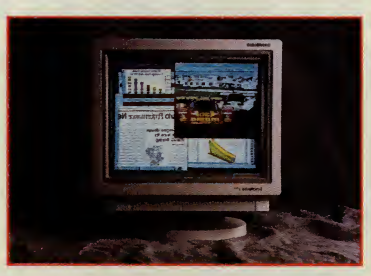
MassMicro DataPac 105 $825.00
MassMicro DataPac *88 R/W (*reads and writes 44 or 88Mb cartridges) $619.00
105Mb Cartridges $95.00
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SCSI 3 in 1 with Cable CALL
SCSI 3 in 1 PowerBook Cable
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Samsung Image 1200 Kit Upgrades Finalé 8000 to 1200 DPI $955.00



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Unlimited color display with up to 1024 x 768 resolution and .31mm Dot Pitch
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Fastest CD-ROM with 200ms access time and 330Kb transfer rate.
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650MB of removable, rewritable magneto-optical storage in a half-height size for internal use in Quadras with a quick average seek time of 40ms, includes 650MB Certified Cartridge.

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For use in the Quadra 900 or 950, Centris 610 or 650, IIvi or vx and Performa 600.

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Hit the road with12ms seek, ultra-low power consumption plus *PBTools*, the right brackets for every PowerBook, and Roadrunner formatting software. Memory for your mobile Mac? Bundle up some Coyote memory with your new drive. Recognized as the quality leader, Coyote PowerBook RAM from Microtech features TSOP, pseudoStatic, low power chips, rigid boards and protective mylar shielding. And Coyote RAM for PowerBook 160/180's is always 85ns or faster, FASTRAM enabled.

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MICROTECH TWO YEAR WARRANTY



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Quality engineered in our own labs, Polaris drives deliver the quality components, high level design and rigorous quality control testing Microtech is famous for. Polaris drives ship complete with SCSI cabling for external models; complete brackets and installation manual for internals.

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Maxstor 7213	207MB	15ms	3500 RPM	3.5" *	$ 449	$ 359	2 years
Maxstor MXT540	520MB	9ms	6300 RPM	3.5" *	$1099	$1009	2 years
Maxstor MXT1240	1150MB	9ms	6300 RPM	3.5"	$1689	$1599	3 years
Micropolis 2112	1.0GB	10ms	5400 RPM	3.5"	$1629	$1539	5 years

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42 mb LPS	17 ms	$168	$228
85 mb LPS	17 ms	$188	$248
120 mb LPS	12 ms	$258	$308
170 mb LPS	12 ms	$268	$328
212 mb LPS	9 ms	$358	$409
540 mb	8.5 ms	$868	$928

QUANTUM

GO•Drive 2.5" Hard Drive (All Quantums - 2 year Warranty)			
160 mb	17 ms	$499	$599
ELS Series (3.5" Low Profile and Low Power Drives)			
85 mb	17 ms	$199	$259
127 mb	17 ms	$255	$314
170 mb	17 ms	$279	$339
LPS Series (3.5" Low Profile and Low Power Drives)			
240 mb	10 ms	$359	$419
525 mb	10 ms	$889	$955
Prodrive Series (3.5" Half Height Drives)			
1.0 Gig	10 ms	$1325	$1385
1.2 Gig	10 ms	$1479	$1539

TOSHIBA

3.5" & 2.5" Disk Drives (2 year Warranty)			
2.5" 213 mb	12 ms	$548	$648
3.5" 830 mb	12 ms	$1029	$1089
3.5" 1.2 Gig	12 ms	$1329	$1389

FUJITSU

3.5" & 5.25" Disk Drives (5 year Warranty)			
3.5" 520 mb	9 ms	$788	$888
3.5" 1.1 Gig	8.5 ms	$1548	$1599
5.25" 1.2 Gig	11.5 ms	$1188	$1288
5.25" 2.06 Gig	11.5 ms	$2119	$2219
5.25" 2.4 Gig	11.5 ms	$2274	$2395

SEAGATE

3.5" Half Height Drives (1 and 5 year Warranties)			
1.2 Gig	10.5 ms	$1339	$1399
Wren and Elite Series (5.25" Full Height Drives)			
Wren 7 1.2 Gig	15 ms	$1199	$1389
Wren 8 1.6 Gig	15 ms	$1649	$1749
Wren 9 2.1 Gig	12.5 ms	$1858	$1949
Elite 1 1.6 Gig	11.5 ms	$1799	$1899
Elite 2 2.4 Gig	11 ms	$2499	$2599
Elite 3 3.4 Gig	11 ms	$3399	$3499

Media

Model	QTY 1	5PK	10PK	Model	QTY 1	5PK	10PK
SyQ44 cart	$67	$65	$63	SyQ 88 cart	$107	$104	$99
128mb OPT	$42	$39	$37	256mb OPT	$86	$84	$79
60mm DAT	$17	$14	$12	90mm DAT	$19	$17	$14

Modems

PROMETHEUS

	Price
Ultima Home Office ext 14.4/14.4SR Fax w/ V.42 bis & voice	$398
Promodem 144i Internal for Powerbook 14.4/14.4SR Fax w/ V.42 & V.42 bis	$268
Promodem 144e ext 14.4/14.4 SR Fax w/ V.42 & V.42 bis	$268
Promodem 24e ext 24/96SR Fax w/ V.42 & V.42 bis	$128
Promodem Mini 2400 2400 BPS mini, data only	$79

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All units come with Microphone LT Software	Price
Faxmodem PBK for Internal Powerbook 96/48 SR Fax w/2400 BPS Modem	$99
Faxmodem PKT Portable 96/48 SR Fax w/2400 BPS Modem	$109
Faxmodem FXV V42 bis/MNP5/2400 BPS, 96/96 SR Fax	$139
Faxmodem VFX V.32 V.32 bis,14.4 data & fax, V.42 bis/MNP5	$269

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KODAK COMPATIBLE

499.00

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Model	Without FPU	with FPU
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WangDat 5.0 Gig DAT	$1398	$1498

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8361.....AE - 3.5", FDHD External Floppy 229
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3553.....VFX V.32bis Fax/Modem 259

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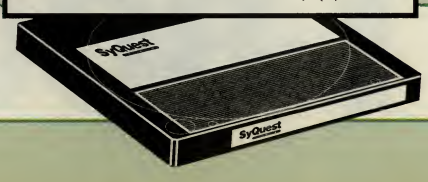
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7603.....PowerPak PB Carrying Case...68



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7370.....Business Traveler.....199

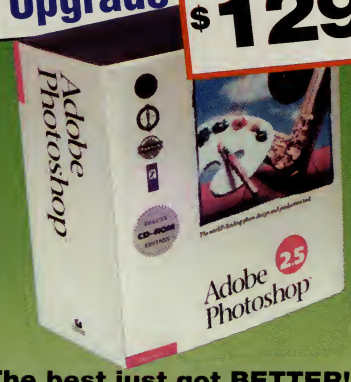
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10390...PowerBook Starter Kit.....122
Connectix 30 day MBG
8441.....CPU PowerBook Utilities 49
Double Case 30 day MBG
10303...PowerBook Hard Case.....115
10306...PowerBook Hard Case w/space.....139
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1835.....Notebook Display Adapter 4 MB ...479
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5976.....PowerBook Keypad (+$20 rebate) ...79
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Color System

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Macintosh Duo 210

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Also included in this system is an Apple Duo Dock for turning Duo's into desktop systems. The Duo Dock has a math coprocessor, internal FDHD Floppy Drive, two NuBus slots, two serial ports, one ADB port, one SCSI port, and a video out port. Along with this Duo Dock you will receive a 14" RGB monitor, and an Apple Extended Keyboard.



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2530.....Iomega - Gold Std 90m Cartridge 149
2467.....Iomega - Gold Std 90m Tripak 439
10604...MultiDisk Cartridge 35 MB 49
10606...MultiDisk Cartridge 65 MB 79
10599...MultiDisk Cartridge 105 MB 105
10602...MultiDisk Cartridge 150 MB 149

Floppy Disks

3297.....Sony 3.5" 800k Disks(10) 9
6148.....Sony 3.5" 800k Disks(30) 25
3298.....Sony 3.5" FDHD Disks(10) 14
6375.....Sony 3.5" FDHD Disks(30) 39
2214.....Fuji 800k Disks(10) 9
2242.....Fuji 800k Disks(50) 32
2241.....Fuji FDHD Disks(50) 59
2243.....Fuji 800k Color Disks(10) 10
2239.....Fuji FDHD Color Disks(10) 14

Optical Media

2865 PLI - 21 MB Floptical Cart(1).....27
6767 PLI - 21 MB Floptical Cart(5)....125
2899 PLI - 21 MB Floptical Cart(10)...245
3016 PLI - 512 MB -5.25" Media(1)....129
11524 ...Sony - 3.5" 128 MB Optical.....59
11523 ...Sony - 5.25" 1024 MB Optical.....139
11522 ...Sony - 5.25" 512 MB Optical.....139

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3943 3M - 40 MB Tape Cartridge 17
1603 Sony - DG60m DAT Tape Cartridge.....16
2520 Sony - DG90m DAT Tape Cartridge.....16
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Quadra 950
WorkGroup Servers

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PowerBook Duo 230
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This line of drives offer an incredible value from a proven manufacturer.		
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ETC DataDrive 525Q	903	963
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ETC DataDrive 213M	399	459
ETC DataDrive 340M	635	689
ETC DataDrive 1200M - Panther	1379	1489
Fujitsu		
ETC DataDrive 425F	$849	$889
ETC DataDrive 520F	889	949
ETC DataDrive 1200F - 5.25"	1289	1399
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Media

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Apple 16" RGB Monitor	1293
Apple 21" RGB Monitor	3181

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Radius Monochrome Card	259
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Radius Color Pivot Board	499
Radius 21" Two-page Color Monitor	2469
Radius 8XJ Video Board	515
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SuperMac

SuperMatch 17T Trinitron Monitor	$1089
20" Color Dual-Mode Trinitron	2519
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Spectrum/8•24 PDQ	829
Spectrum/24 Series IV	829
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DoubleColor SX Video Board	369
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Futura MX Video Board	815

Seiko

CM1445 13" RGB Monitor	$489
CM1760LR 17" Trinitron RGB Monitor	1199

Sony

14" Trinitron Monitor (1430)	649
16" Trinitron Monitor (1604)	1125

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Texas Instruments

TI microLaser PS17	$1139
TI microLaser PS35	1269
TI microLaser Turbo	1459
TI AppleTalk Interface Kit	50

Apple

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Apple Personal LaserWriter NTR	1336
Apple LaserWriter IIf	1620
Apple LaserWriter IIg	1938
Apple LaserWriter Pro 600	2056
Apple LaserWriter Pro 630	2469

Digital Equipment Corp.

DEClaser 1152	$1079

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GCC PLP II	779
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QMS PS-825	3499
QMS PS-815MR	4059
QMS ColorScript 210	4499

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Apple One Color Scanner	$1323
Microtek Scanmaker II	929
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UMAX UC840	1299
UMAX UC1200	2999
UMAX UTA-1 Transparancy Option	699

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ETC DataFlow II (Tk & Tn) or (Tk & 10T)	$155
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10MB MODULE P/B 160/180
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4MB MODULE P/B 140; 145; 170
6MB MODULE P/B 140; 145; 170
2MB MODULE POWERBOOK 100
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1MBX8-80
2MBX8-80
2MBX8-70
4MBX8-80
4MBX8-70
4MB with PAL
8MB Standard
8MB Q700
16MB Standard
16MB Q-700

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New! 4MB Q-800
New! 8MB Q-800
New! 16MB Q-800
New! 32MB Q-800

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New! 32MB VX Kit
New! 64MB VX Kit

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8MB IIfx-70
16MB IIfx-70

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through
7MB Portable/Backlit

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VRAM

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NEW!
– Syquest 105mb drives – now in stock!

All Syquest 44/88 cartridges are bundled with DIVA VideoShop *– a $599 value –* **FREE!** until 5/15/93

SyQuest

Model	
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External SyQuest 88mb (One Cartridge Inc.)	$485
External SyQuest 88mb C* (One Cartridge Inc.)	$585
External SyQuest 105mb (One Cartridge Inc.) *NEW!*	$745
Internal 44mb SyQuest (for Quadra 900&950)	$345
Internal 88mb SyQuest (for Quadra 900&950)	$465
Internal 88mb C SyQuest (for Quadra 900&950)	$555
External SyQuest Dual 44mb (One Cartridge Inc.)	$725
External SyQuest Dual 88mb (One Cartridge Inc.)	$895
External SyQuest Dual 44/88mb (One 44 & One 88 Cartridge)	$895
External SyQuest Dual 88C mb(One Cartridge Inc.)	$1075
External SyQuest Dual 44/88C mb(One 44 & One 88 Cartridge)	$995
SyQuest 44mb Cartridge/10 Pack	$62.50/$610
SyQuest 88mb Cartridge/5 Pack	$96.50/$475
SyQuest 105mb Cartridge/5 Pack	$79/390

All SyQuest Drives come with FWB™ HDT Formatting Software. SyQuest carries a TWO year Warranty on Drives and ONE year on Cartridges. *READS AND WRITES 44 AND 88 CARTRIDGES. Does not format 44 cartridges.

Quantum

"An Apple Authorized Brand"

Formatted Capacity	Speed	Size	Internal	External
ELS 42mb	19ms	3.5"TH	$169	$229
ELS 85mb	17ms	3.5"TH	$195	$255
ELS 127mb	17ms	3.5"TH	$229	$289
ELS 170mb	17ms	3.5"TH	$259	$319
LPS 240mb	10ms	3.5"TH	$339	$399
LPS 525mb	10ms	3.5"TH	$869	$929
Pro 700mb	10ms	3.5"HH	$1139	$1199
Pro 1.05gb	10ms	3.5"HH	$1239	$1299
Pro 1.22gb	10ms	3.5"HH	$1399	$1459
*GRS•80mb	16ms	2.5"PB	$289	$389
*GO•120mb	16ms	2.5"PB	$339	$439
*GRS•160mb	16ms	2.5"PB	$489	$589

TWO year Warranty. *ONE year Warranty on GO drives. FWB™ HDT Formatting Software Included.

TOSHIBA

Formatted Capacity	Speed	Size	Internal	External
877mb	12.5ms	3.5"HH	$999	$1059
1.23gb	12.5ms	3.5"HH	$1239	$1299
213mb	12ms	2.5"PB	$545	$645
CD-ROM				
600mb *NEW!*	200ms	3.5"HH	$469	$499

Dual Speed/Photo-CD/Multisession compatible

Toshiba carries a THREE year Warranty on drives. ONE year Warranty on CD Rom. FWB CD Rom Tool Kit Formatting Software Included.

HARD DRIVES

FUJITSU

SPECIAL! Fujitsu 520mb Int. *– $799 –*

Formatted Capacity	Speed	Size	Internal	External
513mb *SPECIAL!*	9ms	3.5"HH	$799	$899
1.0gb	9ms	3.5"HH	$1545	$1605
1.03gb	15ms	5.25"FH	$1245	$1345
1.65gb	15ms	5.25"FH	$2245	$2345
2.05gb	12ms	5.25"FH	$2445	$2545

FIVE year Warranty. FWB™ HDT Formatting Software Included.

CONNER "An Apple Authorized Brand"

Formatted Capacity	Speed	Size	Internal	External
82mb	17ms	3.5"TH	$189	$249
160mb	13ms	3.5"TH	$255	$315
206mb	12ms	3.5"TH	$339	$399
515mb	10ms	3.5"HH	$879	$939

TWO year Warranty. FWB™ HDT Formatting Software Included.

MICROPOLIS "Novell Certified"

Formatted Capacity	Speed	Size	Internal	External
698mb	10ms	3.5"HH	$1235	$1295
1.05gb	10ms	3.5"HH	$1335	$1395
2.1gb	12ms	5.25"FH	$2695	$2795

Fast SCSI-2 Drives. FIVE year Warranty. FWB™ HDT Formatting Software Included.

Maxtor®

Formatted Capacity	Speed	Size	Internal	External
120mb	15ms	3.5"TH	$209	$269
203mb	15ms	3.5"TH	$299	$359
325mb	15ms	3.5"HH	$569	$629
520mb	9ms	3.5"HH	$899	$959
1.15gb	9ms	3.5"HH	$1439	$1499
1.0gb	13ms	5.25"FH	$1199	$1299
1.43gb	13ms	5.25"FH	$1449	$1549

TWO and THREE year Warranty on 3.5" Drives and FIVE Years on 5.25" Drives. FWB™ HDT Formatting Software Included.

MAGNETO-OPTICAL

TEAC

Model	Speed	Size	External
128mb	45ms	3.5"HH	$975
128mb cartridges (Tosoh)			$39

RICOH

Model	Speed	Size	External
128mb	45ms	3.5"HH	$1069
650mb	28ms	5.25"FH	$2339
128mb/650mb Cartridge			$39/99

Maxtor®

Model	Speed	Size	External
Tahiti IIM	35ms	1.0gb	$3175
1.0gb Optical Glass Cartridge			$225

All MO drives come with FWB HDT software, one MO cartridge and have a ONE year Warranty.

TAPE BACK-UP

ARCHIVE

Model	External
2.0gb Standard	$1065
4.0gb - 8.0gb Compression Turbo	$1495
90m /60m Tape	$19/$16

TEAC

Model	External
150mb Tape Backup Drive	$469
600mb Tape Backup Drive	$669
600mb / 150mb Tape Cassette	$25/$20

All tape backup drives come bundled with FREE Retrospect V.2.0, one tape and have a ONE year warranty.











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• IIvx 4/80	$1499
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Powerbook 160 4/40 – 4/80 – 4/120	$2319/$2659/$2999
Powerbook 180 4/80 – 4/120	$3919/$4269
Powerbook 165 Color 4/80 – 4/120	$3239/$3589
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LC III 4/80 – 4/160	$1289/$1429
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Centris 610 4/80 w/o Ethernet	$1679
Centris 650 4/80 w/o Ethernet	$2449
Centris 650 8/80 with Ethernet	$2899
Quadra 950 8/0	$4669
Quadra 800 8/230 – 8/500	$4029/$4669
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Apple LaserWriter Pro 600/630	$1999/$2419
Apple Color Printer	$2239

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PowerBook Battery	$79
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Auto Power Adapter/Empire Engineering	$89
GCC WriteMove II Printer	$499
AE AxCell (Cellular Phone Interface)	$270
AE DataLink PB	$473
AE Powerbook Auto Adapter	$66
E-Mach PowerLink Presenter	$479
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Duo Rechargable Battery	$69
Duo Dock	$975
Apple Mouse II	$79
Carrying Cases:	
I/O Design Ultimate SL/EX - nylon	$69/$79

For memory see Macintosh SIMMS section on next page, and for 2.5" drives see Quantum and Toshiba section above.

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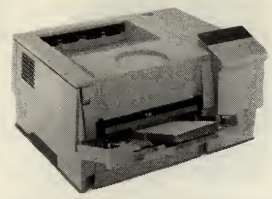
MultiSync 3FGx – 15" Monitor	$615
MultiSync 4FG – 15" Monitor	$735
MultiSync 5FGe ***NEW!*** – 17" Monitor	$1145
MultiSync 5FG – 17" Monitor	$1305
MultiSync 6FG – 21" Monitor	$2355
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FG24x 24-bit board	$1205
FG24xp 24-bit board	$505
CD-Express	$355
CD-ROM CDR-74	$625
Multi-Media Gallery	$805
SilentWriter 95F Printer	$1299
SilentWriter 95FX Printer	$1539
SilentWriter 97F Printer	$1579
SilentWriter 97FX Printer	$1819
ColorMate PS-40 Color Printer	$3499
2mb upgrade for printers	$95



NEC MultiSync 5FG Monitor
- 17" Multi-Frequency Color Monitor
- AccuColor Control System
- Up to 1024x768 resolution

MacUser ★★★★★ August 1992

$1305



NEC SilentWriter Model 95f Laser Printer
- PostScript Level 2
- Envelope feeder and cassette included
- 6ppm/300dpi/2mb RAM

MacUser ★★★★ September 1992

$1299



NEC CDR-74 CD-ROM Reader
- 280ms access time
- Photo-CD/Multisession compatible
- 2-year warranty

MacUser ★★★½ March 1993

$625

*– Get a **$100 rebate** from NEC when you purchase a MacFG 24Xp card with either a 15" or 17" MultiSync FG monitor. Offer ends 6/30/93 –*

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21" Color Hitachi	$2569
20" Color Trinitron MultiScan RO	$2349
20" Color Hitachi MulitScan	$1339
24 STV Interface	$769
24 SX Interface	$619
24 XLI Interface	$1929
Paintboard 24	$1549
Paintboard LI	$829
CorrectPrint 3001	$6999

radius

PrecisionColor Display/20 or 20s	$2399
PrecisionColor 19	$2099
PrecisionColor Pivot	$969
PrecisionColor 24XK Interface	$839
PrecisionColor 24XP Interface	$499
PrecisionColor 8XJ Interface	$499
VideoVision (Basic)	$1679
VideoVision (Presentation)	$1999
Rockets 25i	$999
Rockets 33	$1999
RocketShare	$419
SCSI-2 Booster	$249





SUPERMAC

SuperMatch 21" Color Monitor	$2499
SuperMatch 17" Color Monitor/Multimode	$1179
Two-Page 21" Platinum Monitor	$999
SuperMatch 17T Color Trinitron Monitor	$1089
Thunderstorm	$839
Spectrum 24 PDQ Plus	$1549
Thunder/8	$1169
Spectrum/8 • 24 PDQ	$839
Spectrum 24/Series IV	$839
VideoSpigot Nubus	$379
Spigot and Sound Pro w/Adobe Premiere v2.0	$1169
Digital Film w/Adobe Premiere v2.0	$4799

SONY

1430 - 14" Color Trinitron	$669
1320LC - 14" Color Trinitron for LC	$429
1604S - 16" Color Trinitron	$1089

Includes MAC Adaptor. Quadra compatible.

E-MACHINES

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ColorMax 15"	$739
ColorMax 20H - 20" Hitachi	$1639
ColorMax 20T - 20" Trinitron	$2049

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Wacom

6x8 Artz	$309
6x9 Standard Tablet	$462
12x12 Standard Tablet	$660
12x12 ElectroStatic Tablet	$726
12x18 Standard Tablet	$990
12x18 ElectroStatic Tablet	$1058

MACINTOSH SIMMS

1x8/2x8/4x8/16x8 @ 80ns	$31/$61/$135/$545
Quadra 700/950	
4x8/16x8	$135/$545
Powerbook 140/170	
4mb/6mb/8mb	$159/$255/$355
Powerbook 160/180	
4mb/6mb/8mb/10mb	$195/$275/$385/$445
Duo 210/230	
4mb/6mb/8mb/10mb	$210/$299/$399/$499
PC 1x9/4x9	$39/$139
Co-Processors 16MHz for LC-LCII/20MHz for SI	$59/$119
NEW 32-BIT SIMMS	
4x8/8x8/16x8 @ 70ns – Centris & LCIII	$139/$259/$535
4x8/8x8/16x8 @ 60ns – Quadra 800	$149/$289/$699

PRINTERS

GCC TECHNOLOGIES

WriteMove II	$499
WriteImpact 24-Pin	$499
PLPII 1mb/4ppm/300dpi	$799
BLPII 2mb/4ppm/300dpi	$1499
BLP Elite 2mb/4ppm/300dpi	$1149
WideWriter 360 512k/360dpi	$1399

HEWLETT PACKARD

Deskwriter	$409
Deskwriter 550-C	$769
LaserJet 4M	$1999

Dataproducts

The high performance printer people.™

Dataproducts LZR 1560	$2999

Two Trays: Letter and Legal. 15ppm/300-400dpi with 4mb RAM upgradeable to 8mb. Postscript Level 2.

4mb RAM upgrade	$349
Toner	$289



TEXAS INSTRUMENTS

Microlaser Plus PS-17 with Appletalk	$1179
Microlaser Plus PS-35 with Appletalk	$1299
Microlaser Turbo with Appletalk	$1459
AppleTalk Kit	$49
1mb upgrade for PS-17/PS-35/Turbo	$49
Toner Cartridge	$49

SCANNERS

UMAX

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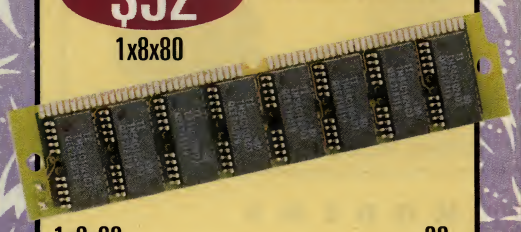
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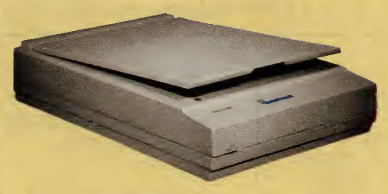
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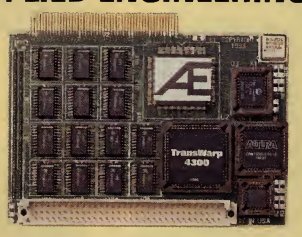
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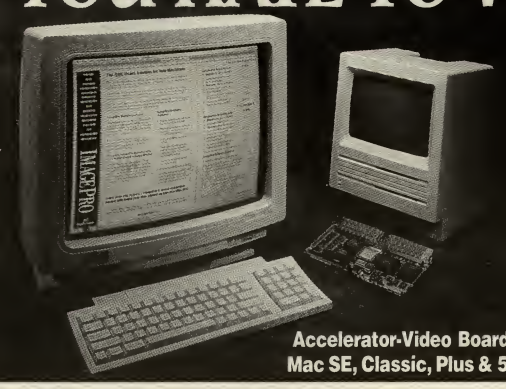
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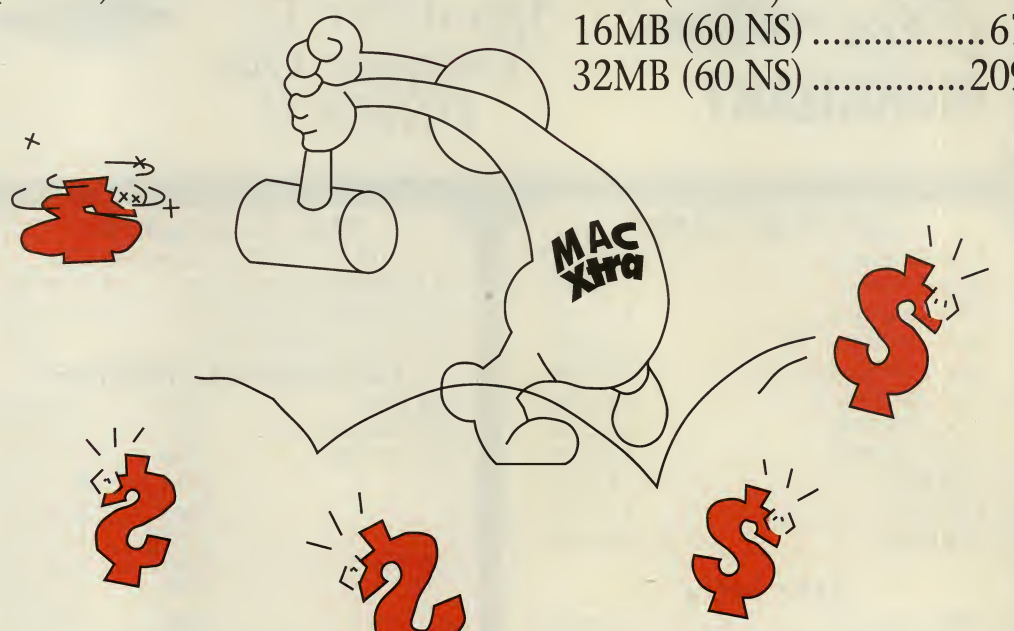
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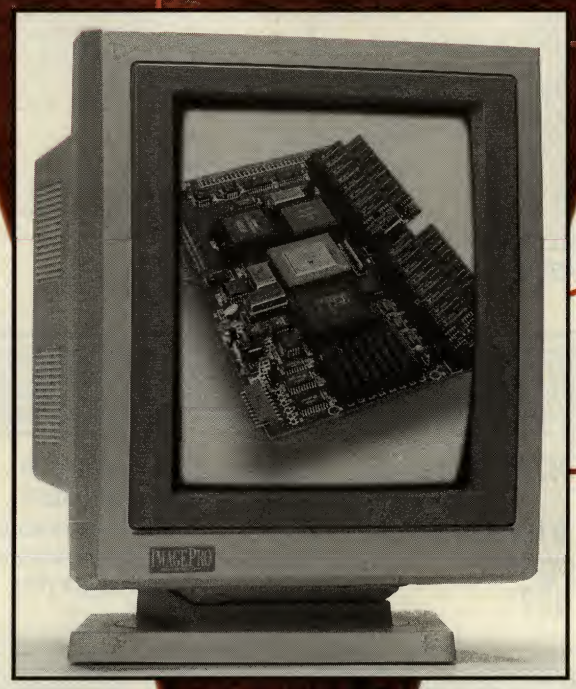
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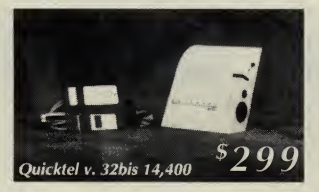
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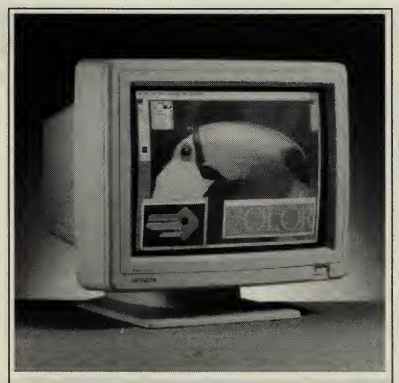


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14 Inch 256 Color Monitor!
$359
Complete 8-Bit Package - $499



Compatible with Macintosh On-Board Video: LC, LCII, si, ci and Quadra 900/950

Editing Aces 3,499
24STV - Multi Media 799
MoviePak 1,499
24XLTV Multi Media .. 2,639
24MxTV Multi Media . 1,649
MediaTime Multi M.... 1,499
ProColor 32 3,149
24XLi 1,889
PaintBoard 24 1,449
PaintBoard Li 849
8XL 499
ClearVue/Classic 299
ClearVue/LC 299
Sweet 16" Monitor 1,249



MoviePak
Adobe Premiere Special!
MoviePak works with all RasterOps multi-media display adapters to give you full-motion digital video recording, and full-scree playback and print-to-tape capabilities, all in a single-slot solution for any size Macintosh.
$1,499 RASTEROPS®
For a limited time, MoviePak includes Adobe Premiere free - a $695 value!



20 Inch Color Trinitron!
$1,599 Monitor Only

Trinitron Monitor Only 1,599
Business Package* - 256 Color 1,799
Artist Package* - 16 Million Color .. 2,449
** Package includes a new 20" Relax Mac compatible Trinitron color monitor, video board, and cable. 72 dpi for WYSIWYG. 1024 x 768.*

radius



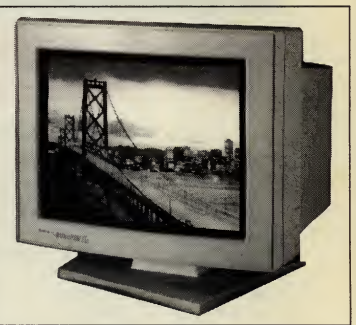
PrecisionColor 8XJ 489
256 colors (8-bits) at maximum resolution (1,152 x 882), 4 display resolutions, accelerated.
PrecisionColor 8X 739
256 colors (8-bits) at maximum resolution (1,152 x 882), 4 display resolutions, accelerated.
PrecisionColor 24XP 489
16 million colors (24-bits) at maximum resolution (832 x 624), 2 display resolutions, accelerated.
PrecisionColor 24XK 819
16 million colors (24-bits) at maximum resolution (1,024 x 768), 3 display resolutions, accelerated.

Special Offer!! DirectColor 24-bit Video Card With QuickColor Graphics Accelerator Card **$699**

PrecisionColor 24X 1,629
16 million colors (24-bits) at maximum resolution (1,152 x 882), 4 resolutions, non-accelerated.
Color Pivot
Video Board (NuBus, SE, LC) 499
Mono Pivot Video Board 249
PowerView (PowerBook) 489
VideoVision 1,929
16 million colors (24-bits) at maximum resolution (640 x 480), 4 display resolutions, non-accelerated, video capture up to 30 frames/sec.
PrecisionColor Software 249
Radius Rocket 33 1,949
Radius RocketShare 399
Radius SCSI-2 Booster 249

20 Inch Sampo OfficePro IIa 256 Grayscale! $599 Monitor Only

20" Sampo Monitor Only 599
Mac II, x, fx, cx, ci Package* 799
Mac LC, LCII, SE/30 Package* 999
20" Ikegami Monitor Only 799
Mac II, x, fx, cx, ci Package* 999
Mac LC, LCII, SE/30 Package* 1199
** Package includes new 20" Mac compatible grayscale monitor, video board, and cable. 72 dpi for WYSIWYG. 1024 x 768.*



SIMMs & Accel.

Mac II, IIx, IIcx, IIci & Quadra:

Classic 3 Meg. Card w/1 Meg. 49
1 Meg.- 1M x 8 - 120, 100, 70 .. 26, 29, 32
2, 4, 8 Meg. x 8 - 80 59, 119, 279
4 Meg. - 4M x 8 - 70 129
16 Meg. - 16M x 8 - 80 499
16 Meg. - 16M x 8 - 80 (Low) 529
16 Meg. - 16M x 8 - 70 (Q-950) 499

Mac IIfx:

4 Meg. - 4M x 8 - 70 (IIfx) 149
8 Meg. - 8M x 8 - 80 (IIfx) 299
16 Meg. - 16M x 8 - 80 (IIfx) 599

Mac Centris, Color Classic, LCIII, Quadra 800

1 Meg. - 1M x 32 - 70 (72pin) 129
1 Meg. - 1M x 32 - 60 (72pin) 139
2 Meg. - 2M x 32 - 70 (72pin) 259
2 Meg. - 2M x 32 - 60 (72pin) 269
4 Meg. - 4M x 8 - 70 (72pin) 159
4 Meg. - 4M x 8 - 60 (72pin) 189
8 Meg. - 8M x 8 - 70 (72pin) 329
8 Meg. - 8M x 8 - 60 (72pin) 369
16 Meg. - 16M x 8 - 70 (72pin) 699
16 Meg. - 16M x 8 - 60 (72pin) 849

Video Memory:

Mac LC - 512K Video SIMM 49
Quadra 700 - 256K Video SIMM 29
Quadra 900 - 256K Video SIMM 29
Quadra 950 - 256K Video SIMM 29

All SIMMS have a limited lifetime warranty! Call for latest prices!

Mac Powerbook:

Powerbook 100 - 4, 6 Meg. 179, 229
Powerbook 140/170 - 4, 6 Meg. . 159, 209
Powerbook 160/180 - 6 Meg. 229
PowerBook 160/180 - 8,10 Meg. 349, 449
Powerbook 210/230 - 8, 10 Meg. 399, Call
Powerbook 210/230 - 20 Meg. Call
PowerBook 12-Hour Battery Pack 49

Accelerators & Cache:

Co-Processor - Mac LC 79
Co-Processor - Mac Classic II 79
IIci Cache Card 169
IIsi Cache w/FPU Socket 149
IIsi Cache w/FPU Installed 199
Classic Accel w/Co-Processor 199
SE Accelerator w/Co-Processor 279
Quadra 700/900 Accelerator 299
7VS-A Increases processor speed from 25MHz to 30MHz!

Ethernet/Network



ASANTÉ

Asanté MacCon3 - 64K 189
The 3-in-1 (Thick, Thin and 10BaseT) Ethernet card for most expandable Macintoshes including the IIsi and SE/ 30. Not available for the LC or LCII.
Asanté MacCon+ - 64K 149
Economical, 64K high-performance Ethernet for almost every model of Macintosh. Select either Thick/Thin or Thick/10BaseT. The Asanté MacCon+ models for the LC, LCII and IIsi each have a socket for a co-processor.
Asanté FriendlyNet Adapters 69
Designed to work with the new Apple Ethernet cabling system - a plug-and-play networking system which makes Ethernet as simple and easy as LocalTalk.
Asanté 10BaseT Hub/8 239
An economical way to expand your Ethernet network using unshielded twisted pair wiring (10BaseT).
Asanté 10BaseT Hub/12 479
A more sophisticated and larger version of the Asanté 8-port Hub. The most economical way to expand your Ethernet network using unshielded twisted pair (UTP, 10BaseT). Fully supports IEEE specifications..
AsantéHub 1012 1,379
A 12-port, intelligent 10BaseT hub. Built-in expansion slot for internet-working option cards (optional SNMP in-band module). Multiple hubs can be interconnected via BNC, RJ45 and AUI. Works with AsantéView software (optional) for control directly or remotely.
Asanté Print 349
An inexpensive Ethernet-to-LocalTalk converter that easily connects one or two LocalTalk peripherials to an Ethernet network. With no switches to set or installation software to load, it is smart enough to work right out of the box. Thick/Thin or Thick/10BaseT.
TechWorks Ethernet Cards 99
We made a special purchase of TechWorks Ethernet NuBus cards and are offering them on a first-come-first-served basis. Limited to supply on-hand.

Tribe LocalSwitch 2,499
LocalSwitch is a 16-port intelligent packet-switching hub for Macintosh networks. Using standard LocalTalk protocol and twisted pair wiring, LocalSwitch processes many network transmissions simultaneously.



$2,499 Tribe LocalSwitch

Keyboard

$99



MAK-105 "Tactile Click" ADB interface compatible extended keyboard for Mac SE and Mac II series, 105 keys layout, 15 built-in function keys, Numeric keypad, T-style cursor pad, 6 cursor-control keys and enlarged Return key 99

CoStar



Stingray Trackball $89

Stingray Trackball 89
ADB interface with automatic acceleration. Precision-engineered for accuracy and reliability, and ergonomically designed for maximum comfort and ease of use. Sleek, compact design uses less desk space.



$439 AddressWriter personal envelope and label printer

AddressWriter Printer 439
144 x 144 impact dot-matrix print head. Optional label feeder will handle a variety of pin-fed labels for added convenience and value. Specify voltage.

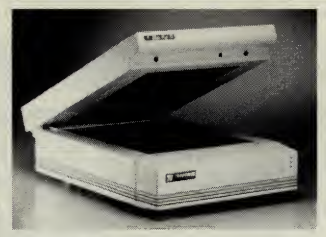


LabelWriter II & LabelWriter II Plus personal label printers
$179 COSTAR

The LabelWriter II and II Plus use direct thermal input technology to produce high-quality labels in a variety of sizes. The LabelWriter can be attached directly to your computer or AppleTalk Network.

LabelWriter II Mac 179
Handles up to 350 labels per roll. Maximum label size: 1-1/8" x 3-1/2". Prints one label in 3-1/2 secs.
LabelWriter II Plus Mac 249
Handles up to 700 labels per roll. Maximum label size: 2-1/4" x 4". Prints one label in 3-1/2 to 7 secs.

300/600/800/1,200 dpi Color & Grayscale Scanners



Tamarack 600 dpi Color Scanner $979 and Slide Attachment $549

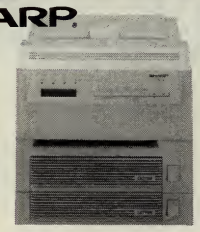
Tamarack 600 Color Scanner:
24-Bit Color - 8.5" x 11.5" 979
Slide Attachment (shown) 549
PhotoShop LE (limited version)* ... 99
PhotoShop 2.0 (full version)* 199

Relax Color: (Epson Engine)
24-Bit Color Scanner - 8.5" x 11.5"
300 dpi - 110 VAC 949
300 dpi - 220 VAC 1,099
Color Studio LE (limited version)* 79
Color Studio 1.5 (full version)* 159
Umax Color Scanners:
UC630 - 8.5" x 14"**
24-Bit 600 dpi w/PhotoShop ... 1,079
Transparency/Slide Attachment . 789
Auto Document Feeder 479
UC1200S - 8.5" x 14"**
24-Bit 1,200 dpi w/PhotoShop 2,999
Transparency/Slide Attachment . 889
Relisys Color Scanner:
ColdScan 800 - 8.5" x 14"
24-Bit 800 dpi 1,099
PhotoShop LE (limited version)* 99
PhotoShop 2.0 (full version)* 199
** with purchase of scanner, ** includes PhotoShop*

SHARP® JX-320 $999
16 Million Color - 300/600 dpi
An affordable, quality, flatbed 8-1/2" x 11", 24-bit color scanner for business and professional use.
Sharp's patented one-pass system ensures quality color while reducing scan times. 600 DPI using Sharp's proprietary software. By strobing three colored fluorescent bulbs through filters the Sharp system ensures optimal color accuracy and eliminates misregistration for clearer reproduction.
The Sharp JX-320 is the first color scanner fully compliant with the new SCSI-2 standard which eliminates the need for special drivers .
Includes the full version of PhotoShop. OCR compatible. Built-in command set includes: downloadable Gamma Tables; Edge Emphasis; Brightness; and, Lightness. 110 VAC only.
Sharp JX-320 Color Scanner 999
Transparency Option JX-32F3 799

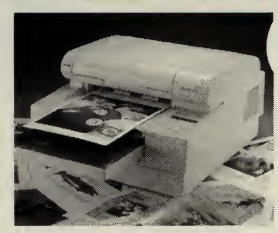
PostScript Printers Mac & IBM Compatible

SHARP



600 dpi Engine, 8 ppm, RISC Processor, AppleTalk on-board. Scalable typefaces (PostScript and PCL5) generating thousands of fonts. Printer emulations include Hewlett Packard, IBM ProPrinter & Epson. Parallel and serial interface with automatic sensing. 2 MB RAM (expandable to 8MB).

$1,199



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The Océ G5241 puts the power of color PostScript® printing on your desktop using a true Adobe® PostScript interpreter. Using the thermal transfer method, the G5241 prints either 3 or 4 color on letter or A3 size, paper or overhead transparencies at 300 dpi.

$1,999

The Océ G5232 has all the great qualities of the G5241 but increases the printing capability to tabloid size pages at 300 dpi. True PostScript®, 35 Adobe fonts in ROM, downloadable fonts sup-ported. 8Mb Ram, 20Mb hard drive.

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SyQuest® REMOVABLE TECHNOLOGY

$389 Mobile 44 SQ555
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$579 Mobile 88+ SQ5110C

Reads and writes both 44 and 88 Meg. cartridges!

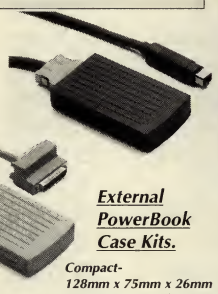
Cartridge	1 to 4	5 and Up
44 Meg.	63	61
88 Meg.	97	94

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Diva Video Shop Plus Megs of QuickTime Movies *FREE* on Every Cartridge !!



Desktop performance that fits in your pocket!

Our powerful 80MB, 120MB and 160MB FreeLance drives are designed for the Apple PowerBook computers - we even use the same quality drives Apple uses! Light (less than 10 ounces) and fast (17 ms seek time), the FreeLance features quiet and reliable Quantum Go•Drive Series™ drives for added value. Includes everything you need to work with the PowerBook including a ADB port power cable and SCSI cable for the Macintosh.



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FreeLance Drive Packages:

80 Meg. FreeLance Go•Drive ... 429
120 Meg. FreeLance Go•Drive ... 549
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Includes your choice standard Mac or PowerBook case and a PowerBook or standard Macintosh SCSI Cable.

Cases and Accessories:

Adapter - DB25M/HDI30 29
Gray Case & ADB pwr. cable 70
Platinum Case & ADB pwr.cable .. 70
SCSI Cable - DB25M/DB25M 19
SCSI Cable - DB25M/Cent50M 19

External PowerBook Case Kits.

Compact- 128mm x 75mm x 26mm Compatible with most 2.5" hard drives- Quantum, Conner, Seagate. Powered by the Apple ADB Bus with included cable or optional AC adapter. Front panel LED operation indicator. External SCSI ID switch.

DAT, ExaByte & Teac Tape Drives & Tape Media

Tape Drives include media, software and cables!

Tape Drives:

160 Meg. Tape Vista - TEAC 449
250 Meg. Tape Vista - Archive 599
600 Meg. Tape Vista - TEAC 649

DAT & ExaByte Drives Include Retrospect Software!

DAT 4 mm Drives:

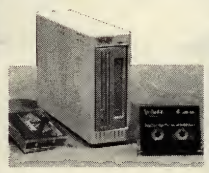
2.0 Gig. DAT Sierra - Archive 1,069
2.0 Gig. DAT Sierra - ExaByte DAT . 1,199
2.0 Gig. DAT - Hewlett Packard..... 1,399

Compression DAT 4 mm Drives:

8.0 Gig. DAT Sierra - Archive 1,359
8.0 Gig. DAT Sierra - ExaByte DAT . 1,499
8.0 Gig. DAT - Hewlett Packard..... 1,549

ExaByte Helical Scan 8 mm Drives:

2.2 Gig. Tape Vista - ExaByte 8200 . 1,799
5.0 Gig. Tape Vista - ExaByte 8500 . 2,839



2.0 Gig. DAT Tape

Retrospect software & tape included!

$1,199

EXABYTE

Relax 600 Meg. Tape 649

Selected for performance, value and service. Quality at low cost. Perfect for backing up hard disks up to 600 megabytes. Complete package includes software, cables and media. MACWORLD - 12/92.

MACWORLD MW EDITORS' CHOICE

Backup Tapes!



Teac Tape Media:

60 Meg Teac CT-600H 25
60 Meg Cassettte-Verbatim 19
160 Meg Teac CT-600N 29
160 Meg Cassette- Verbatim 24
600 Meg Teac CT-600F 39

Archive Tape Media:

150 Meg Archive- Verbatim 29
250 Meg Archive- Verbatim 33

4mm DAT Tape Media:

1.3 Gig DAT 4 mm 60m 25
2.0 Gig DAT 4mm 90m 35

8mm DAT Tape Media:

8mm DAT-Verbatim 106m 19



Bernoulli Mac 150 $799

Includes cartridge, software and cables.

Iomega has enjoyed an excellent reputation for years as the provider of high quality removable storage for IBM computers. Now they have brought their years of experience to the Macintosh.

• • 150 megabytes of storage in each data cartridge. Includes cartridge, software and cables.

5-year warranty on all data cartridges!

Cartridges - $169

Premium Hard Disk Drives - Macintosh

Seagate

3-1/2" Half Height	Internal	External
240 Meg. - ST3283N, 12 ms.	399	459
510 Meg. - ST1581N, 14 ms.	939	999
1.0 Gig. - ST11200N, 14 ms.	1,239	1,299
5-1/4" Full Height - WREN		
1.0 Gig. - ST41200N, 15 ms.	1,179	1,279
1.4 Gig. - ST41651N, 15 ms.	1,599	1,699
1.9 Gig. - ST42100N, 12.9 ms.	1,799	1,899
5-1/4" Full Height - ELITE Ultra-High Performance		
1.4 Gig. - ELITE-I, 11.5 ms.	1,839	1,939
2.1 Gig. - ELITE-II, 11 ms.	2,499	2,599
3.5 Gig. - ELITE-III, 11 ms.	3,389	3,489

Fujitsu

3-1/2" Half Height		
520 Meg. - 2624FA, 9 ms.	879	939
1.2 Gig. - 2694SA, 8.5 ms.	1,649	1,709
5-1/4" Full Height		
1.2 Gig. - 2266SA, 11.5 ms.	1,289	1,389
2.0 Gig. - 2652SA, 11.5 ms.	2,279	2,379

Maxtor

3-1/2" Low Profile/Low Power		
120 Meg. - 7120S, 15 ms.	209	269
213 Meg. - 7213S, 15 ms.	299	359
5-1/4" Full Height		
645 Meg. - XT8760S, 16.5 ms.	1,299	1,399
1.7 Gig. - Panther, 13 ms.	1,499	1,599

Conner

3-1/2" Half Height		
42 Meg. - CP-3040, 25 ms.	179	239
85 Meg. - CP-30080E, 17 ms.	199	259
120 Meg. - CP30100, 19 ms.	259	319
170 Meg. - CP-30170E, 17 ms.	279	339
212 Meg. - CP-30200, 12 ms.	359	419
545 Meg. - CP-30540, 8.5 ms.	899	959

Hewlett Packard

3-1/2" Half Height		
422 Meg. - HP2235, 12.6 ms.	1,039	1,099
1.2 Gig. - HP2247, 12.6 ms.	1,539	1,599
5-1/4" Full Height		
1.2 Gig. - HP97558, 13.5 ms.	1,639	1,739
1.6 Gig. - HP97560, 13.5 ms.	1,999	2,099

Quantum

3-1/2" ELS Low Profile	Internal	External
42 Meg. - ELS42, 19 ms.	169	229
85 Meg. - ELS85, 17 ms.	195	255
127 Meg. - ELS127, 17 ms.	229	289
3-1/2" PDS, PRO & LPS Series		
240 Meg. - LPS240, 10 ms.	339	399
525 Meg. - LPS525, 10 ms.	869	929
1.0 Gig. - PD1050S, 11 ms.	1,269	1,329
1.2 Gig. - PD1225S, 11 ms.	1,429	1,489
2-1/2" - Internal for the Mac PowerBook only		
80 Meg.- Go•Drive GRS80, 17 ms.	289	389
120 Meg. - GRS120, 17 ms.	339	439
160 Meg. - GRS160, 17 ms.	579	679

Quantum®



High Performance and exceptional reliability are words commonly used to describe Quantum Hard Drives. The company has maintained a superb record of successes with its line of very fast 3 1/2" half-height and the Go•Drive Series™ for the PowerBook. And now Quantum wants to share its achievements by offering you its proven technology hard drives, two year warranties, and at new low factory prices!

Special Purchase
Quantum 127 Meg.
ELS127, 17 ms average access.
$249
External Model $309.

Macintosh CD-ROM Players

Kodak Multisession Compatible
$599



Toshiba CD-ROM - XM3401B 599
Featuring the **Multisession Toshiba XM3401B**. Vista CD-ROM provides state-of-the-art performance including a sealed contamination free environment and an automatic lens cleaning mechanism which dramatically improves reliability. **Fast 200 milliseconds average access.** Full audio control via software is provided by the **Music Box** software. Includes sample CD.

Texel Multisession CD-ROM 549
Featuring the **Texel DM3024**. This is a performance drive with 235 ms average access and double the normal speed - 300 KBytes/sec. data transfer. Kodak Photo-CD compatible!

$299 Portable Player **NEC**



CD-ROM - Mesa Portable 299
New! Manufactured for Relax by NEC, the **Mesa** is a fast, portable and fully functional CD-ROM player for music and data. Call for details about this bargain performer.

Rewritable Optical Drives



$1,499 600 Meg. ISO Optical

- Industry Standard - ISO Certified
- Macintosh - IBM Compatible
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Large, fast and affordable. We offer a variety of solutions for your large capacity data storage needs.

600 Meg. Optimem ISO Model 750 . 1,599
Premium Quality at Low Cost - 60 ms. access.
While Supplies Last - Limited Quantity!

600 Meg. Ricoh ISO 5030E-II 1,499
Factory reconditioned. Full warranty. 67 ms. access.

600 Meg. Ricoh ISO 5031E New! ... 2,499
High performance - 35 ms. average access.

1.0 Gig. Maxoptix Tahiti-II 3,199
High capacity - 1 Gigabyte - 35 ms. average access.

600 Meg. Pioneer MultiFunction 2,199
Rewritable and WORM in one unit.

600 Meg. Pioneer WORM 1,799
Premium quality, best selling WORM

Media:	1 to 4	5 +
600M 5-1/4" Optical Plastic	99	95
600M 5-1/4" Optical P 5-Pk	475	460
600M 5-1/4" Optical Glass	169	159
1.0G Glass, Maxoptix	239	229
600M Multifunction	179	169
600M WORM, Pioneer	109	99



128 Meg. Optical
Macintosh & IBM compatible **$979**

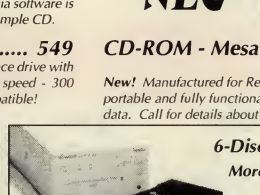
Each 3-1/2" erasable optical cartridge holds over 120 megabytes of data! The **Diablo MO** (shown) is an ideal primary or backup storage device for IBM or Macintosh personal computers. Featuring the Panasonic drive, the **Diablo MO** is IBM and SONY compatible - and it is faster! Complete package - includes SCSI cable, On Location software, and power supply.

Includes media, software & cables!

128 Meg. Ricoh ISO.....1,099
128 Meg. Epson ISO.....1,049
128 Meg. Diablo - Panasonic 979

Verbatim®

Verbatim Media:	1 to 4	5 +
128 Meg. 3-1/2" Optical	44	39
128 Meg. 3-1/2" 5-Pk	195	175
600 Meg. 5-1/4" Plastic	109	105
600 Meg. 5-1/4" P 5-Pk	495	475



6-Disc CD-ROM Mini-Changer
More than 3 Gig of Data On-Line!

PIONEER **$899**

Each compact, easy-loading magazine holds up to 6 different discs. **Additional Mini-Changers can be daisy-chained together to create a CD-ROM library of over 20 Gigabytes of on-line information!** Compatible with SUN, IBM and Macintosh. Can even be used as a CD-Audio jukebox! Full audio control via software is provided by the **Music Box** software (included). Includes SCSI cable, Mac software, and sample CD-ROM. **New - DRM-604X. 4 times the transfer rate - 600K/Sec.**

DRM-600A 6-Disc 899 **DRM-604X 6-Disc . 1,299**

Case Kits

Cases are Made by Relax In the U.S.A.

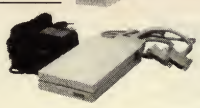


Half Height ..3.5" or 5.25" 89
Half Height..with front cut out 89
Includes 35 watt power supply, prw cable, fan, SCSI ID.
Full Height..5.25" with front cut out .. 119
Includes 55 watt power supply, prw cable, fan, SCSI ID.

Sierra 3.25" 89
Includes SCSI cable, SCSI ID & Power Supply
For PowerBook or any Macintosh



Portable Case Kit for PowerBook or any Macintosh



Includes SCSI cable & power supply
Pocket 3.25" Low Profile 89

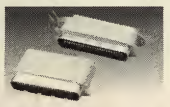
Cables/Terminator

Hi-Quality Molded SCSI Cables



2' AppleDB25 to Cent.50M 9
2' Cent.50M to Cent.50M 19
6' Cent.50M to Cent.50M 29

TermiGard LED Termination Power Indicators The Best you can buy!



Standard Single Ended Cent50 9
Active Single Ended Cent50 29

Macintosh Video Cables for On-Board Video or Most Monitor Brands



Mac 15 pin to RGB 39
Quadra/Centra 16" or 21" 49

SCSI Ulilities

RELAX Formatting Utility supports Hard Drives, Optical Drives, and Removables.
Mac Utilities v1.25 19

Software Architects Formatter One and Formatter Five offer partitioning, AU/X compatibility, Testing, DOS Support and much more.



Formatter One ..partitioning,AU/X 49
Formatter Five ..Dos Support 159

DK Research offers a wide variety of SCSI Software. Support includes, Hard Drives, Optical Drives, and Tape Drives.



Hard Drive ..partitioning, AU/X 39
Optical Drive ..partitioning, AU/X 59
Tape Backup 59

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90 Meg. Fujitsu M2612SA ... 209
180 Meg. Fujitsu M2614SA ... 309
210 Meg. Quantum P210S 329
300 Meg. WREN ST4350NM . 549
320 Meg. Fujitsu M2622SA ... 769
330 Meg. WREN Runner 999
425 Meg. Seagate ST1481N .. 659
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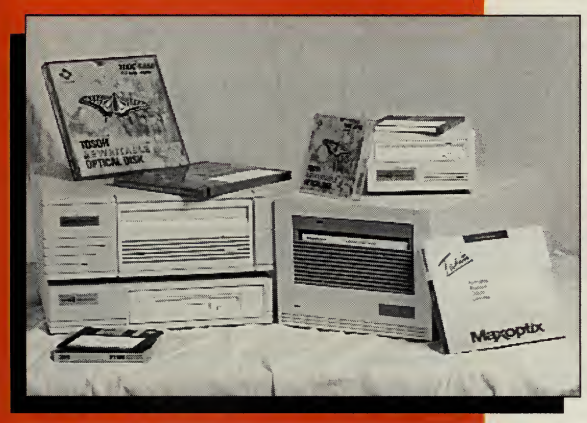
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85Meg	17ms	3600	Quantum	2 Years	$195	$275
127Meg	17ms	3600	Quantum	2 Years	$259	$339
130Meg	17ms	3600	Maxtor	2 Years	$239	$319
170Meg	17ms	3600	Conner	2 Years	$269	$349
213Meg	15ms	3600	Maxtor	2 Years	$329	$409
213Meg	12ms	4500	Conner	2 Years	$339	$419
240Meg	16ms	4300	Quantum	2 Years	$354	$425
340Meg	13ms	3600	Maxtor	1 Year	$589	$669
520Meg	12ms	4400	Fujitsu	5 Years	$829	$909
540Meg	8.5ms	6300	Maxtor	2 Years	$999	$1079
560Meg	10ms	5400	Micropolis	5 Years	$1059	$1139
877Meg	12ms	3600	Toshiba	5 Years	$1059	$1139
1050Meg	10ms	5400	Micropolis	5 Years	$1319	$1389
1080Meg	9.5ms	5400	Fujitsu	5 Years	$1499	$1579
1100Meg	10.5ms	5400	HPackard	5 Years	$1529	$1599
1230Meg	12ms	3600	Toshiba	5 Years	$1329	$1399
1200Meg	8.5ms	6300	Maxtor	3 Years	$1579	$1659
2060Meg	12ms	5400	Fujitsu	5 Years	$2299	$2379

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88Meg	SQ5110C	20ms	$519	$559

Media	44Meg	44Meg5pack	88Meg	88Meg5pack
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Brand	Speed	Transfer	Type	Internal	External
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Toshiba	200ms	330KB/sec	Single Disk	$549	$589
Toshiba	200ms	330KB/sec	Battery Powered	N/A	$729
Pioneer*	380ms	150KB/sec	6 Disk Changer	N/A	$899
Pioneer	270ms	612KB/sec	6 Disk Changer	N/A	$1299

CD's (sold only with CD Drive)	Encyclopedia	World Atlas	Us History	Family Doctor	GuinessRecords	Speakers	Caddies
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2Gig	DAT	Archive	11MB/min	$1039	$1079
2Gig	DAT	Hewlett Packard	12MB/min	$1259	$1299
4-8Gig	DAT	Archive	88MB/min	$1309	$1349
4-8Gig	DAT	HewlettPackard	42MB/min	$1429	$1469

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128Meg	30ms	Fujitsu	Fastest 128Meg	$1099	$1139
650Meg	53ms	Pioneer	MultiFunction	$2059	$2099
650Meg	27ms	Hewlett Packard	MultiFunction	$2559	$2599
1Gig	35ms	Maxoptix Tahiti IIM	MultiFunction	$2959	$2999

Media	20Meg	20Meg 5 pack	128Meg	128Meg 5 pack	650Meg	650Meg 5 pack	1Gig	1 Gig 5 pack
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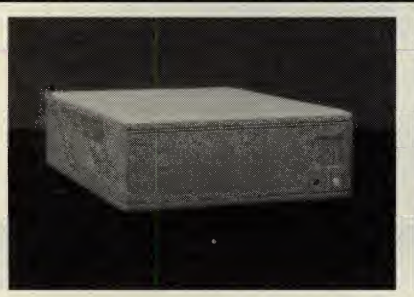
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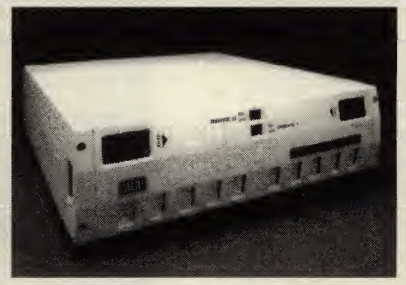
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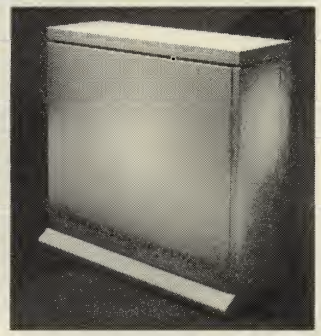
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425	M2623FA	3.5	12	$ 797	$897
520	M2624FA	3.5	12	$ 765	$865
1079	M2266S	FH	14	$1189	$1309
1080	M2694	3.5	10	$1489	$1581
1750	M2652S	FH	11	$1939	$2059
2061	M2654S	FH	11	$2165	$2285

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MB	TYPE	SIZE	SEEK	INT.	EXT
850	DSP3085S	3.5	9.5	$1212	$1307
1050	DSP3105S	3.5	9.5	$1248	$1343
1660	DSP3160S	3.5	10	$1782	$1877
2000	DSP5200S	FH	12.5	$1939	$2056
3500	DSP5350S	FH	11.5	$3300	$3421

MICROPOLIS
5 YEAR WARRANTY

MB	TYPE	SIZE	SEEK	INT.	EXT
560	2105	3.5	10	$954	$1054
698	2108	3.5	10	$1315	$1415
667	1624	HH	15	$1030	$1200
1050	2112	3.5	10	$1230	$1350
1340	1528	FH	14.5	$1710	$1730
1380	1908	FH	11.5	$1890	$2010
2100	1924	FH	11.5	$2515	$2635
3050	1936	FH	11	$3535	$3655

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456	ST3550N	1"	12	$ 815	$ 915
540	ST3600N	1"	10.5	$ 855	$ 955
665	ST4767N	FH	12	$1025	$1125
860	ST1980N	3.5	9.9	$977	$1077
1037	ST41200N	FH	16	$1047	$1147
1037	ST11200N	3.5	10.5	*$1047	$1147
1420	ST41650N	FH	15	$1228	$1348
1420	ST41600N	FH	11.5	$1695	$1815
1900	ST42100N	FH	12.9	*$1580	$1700
2100	ST42400N	FH	11	*$2217	$2337
2900	ST43400N	FH	11	$2808	$2928

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TYPE	MB	SIZE	SEEK	INT.	EXT.
Fujitsu	520	3.5"	12	$ 770	$ 870
Seagate	1.04GB	3.5"	10	$1169	$1250
Fujitsu"Optical"	128	3.5"	30	$1020	$1130
Seagate	1900	FH	12	$1725	$1870

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340	LXT340SY	3.5	13	$ 570	$ 670
540	LXT540SY	3.5	8.5	$ 930	$1030
1240	1240S	3.5	8.5	$1344	$1444
1059	P0-12S	FH	13	$1063	$1193
1345	P1-17S	FH	13	$1287	$1417

QUANTUM
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MB	TYPE	SIZE	SEEK	INT.	EXT
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525	LPS525S	1"	10	$ 750	$ 850
700	PD700S	1"	10	$1155	$1255
1050	PD1050S	3.5	10	$1288	$1388
1200	PD122S	3.5	10	$1438	$1538

CONNER
1 YEAR WARRANTY

MB	TYPE	SIZE	SEEK	INT.	EXT
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212	30200	1"	12	$ 333	$ 430
545	30540	1"	10	$ 872	$ 972

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525MB	LPS525		3.5 1"	10	$889	$949
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1.6GB	ST41600N		5.25 FH	11.5	$1839	$1939
2.4GB	ST42400N		5.25 FH	11	$2451	$2551
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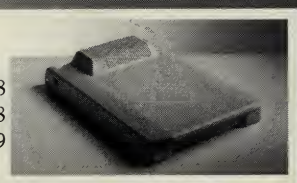
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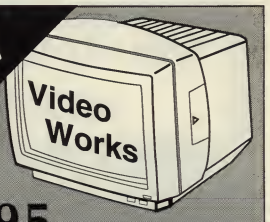
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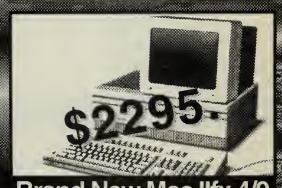
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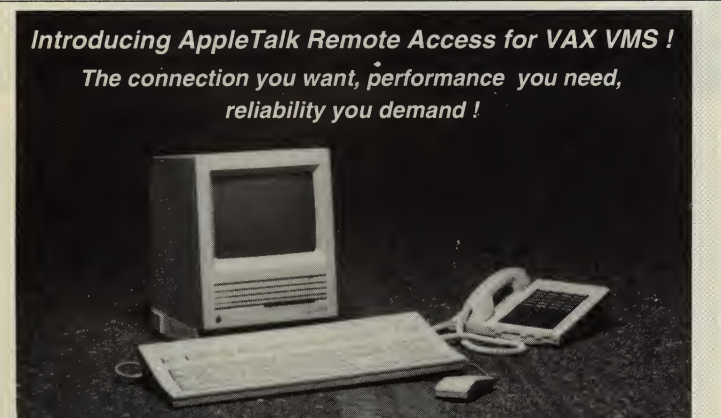
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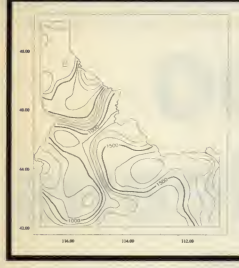
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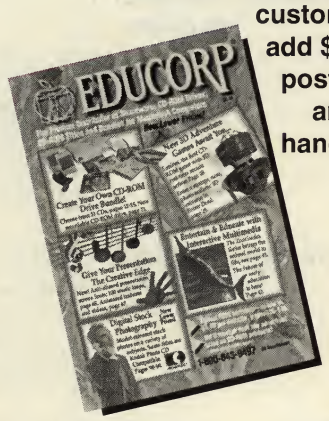
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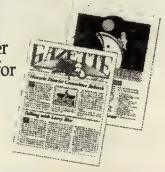
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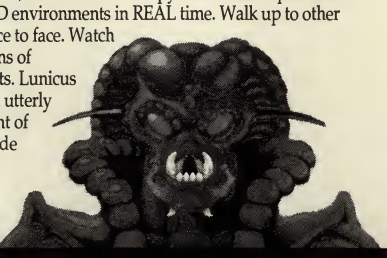
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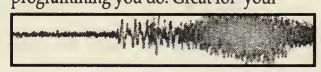
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Summer PBs

From Page 1

less than $1,700 in a 4/80 model. Sources said street prices might go below $1,000.

Those prices are about 30 percent less than the current low-end model, the 145, which is $2,149 in a 4/40 configuration and $2,499 in a 4/80.

Apple has cut costs by redesigning some internal circuitry, moving 4 Mbytes of RAM from a subassembly to the logic board. The company reportedly will sell the 145B with system software already loaded, as it now does with the Performa line. A version of the notebook will be sold through the same consumer channels as the Performas.

The 145B will replace the 145 with identical specifications: a passive-matrix screen, 25-MHz 68030 processor but no math coprocessor and nickel-cadmium batteries.

Apple reportedly plans to subcontract some PowerBook 145B assembly to the Acer Group, a Taiwanese manufacturer of low-cost IBM PC compatibles.

Sources said both Apple and Acer, whose American subsidiary is based in San Jose, Calif., will manufacture the systems, but if demand takes off, Acer can pick up the slack, expanding manufacturing capacity more quickly than Apple could.

▸ **An active-matrix color PowerBook,** due this summer, will be dubbed the 180c, sources said. (It was previously called the 185c.) The unit's 640-by-480-pixel screen is "drop-dead gorgeous," according to a user shown the system. It will sell for about $3,500 in a 4/80 configuration.

Like the PowerBook 165c and 180, the new system will have a 33-MHz 68030 processor and a 68882 math coprocessor.

The color active-matrix screen reportedly requires more power than passive versions, putting extra stress on the battery. However, enhancements to the system's power-saving circuitry deliver from 40 minutes to one and a half hours per charge in some test units, sources said.

Apple's decision to include an ARA client with its notebooks came in response to feedback from customers, sources said. The company originally included the full application, with both server and client capabilities, with all PowerBooks, but quietly ended the bundling arrangement last fall.

Apple declined to comment. □

PowerBook 165c

From Page 1

interested in color said they would prefer it on a brighter, crisper active-matrix screen rather than the 165c's passive-matrix. Apple reportedly will ship an active-matrix color model this summer (see story, Page 1).

"The active-matrix screen lends a little bit more," said Frank Calabrese, manager of personal computing at Bose Corp. in Framingham, Mass. "The 180 is currently our machine of preference. An active-matrix color screen of the same caliber as the 180's active-matrix screen would make a good computer to use.

"I'm watching Apple really closely to see when the release of the [active-matrix color PowerBook] is and how long that puts our field sales force off. The key is whether our sales reps can wait until the new machines are available," Calabrese said.

Yet portable computers with active-matrix color displays have been available on the DOS platform for nearly a year from companies such as IBM Corp., Compaq Computer Corp., Sharp Corp. and Toshiba Corp.

News Analysis

"[The 165c] is competing against laptops and notebooks in the PC world, and the standard in that market is active-matrix color screens. That's tough competition," said Laura Curran, senior analyst at Merrin Information Services Inc., a market research company based in Palo Alto, Calif. "The difference between active and passive screens is incredible."

However, PowerBook 165c proponents said they can afford its $3,199 street price, which is about $1,000 less than a similarly configured PowerBook 180.

"I didn't want to spend the money on a 180," said Rich Marquardt, CSI production manager for Astor Universal, a Keene, N.H.-based division of Markem Corp. "A top executive would probably bite for the 180. I think for your average manager the 165c is just right."

Furthermore, these users said they've found ways to avoid the 165c's narrow screen angle and short battery life. Many users report that it is nearly impossible to view the 165c's 9-inch, passive-matrix color screen from any angle other than dead on. And many report battery life of less than an hour compared with the 180's two-hour average.

"This machine is ideal," said Vernon Huang, a U.S. Navy flight surgeon based in Santa Ana, Calif. "I need portable color on the go. I don't make presentations where the limited viewing angle is an issue, and I'm usually near an AC outlet."

Huang added that for a nominal fee he would consider buying an active-matrix color machine but only with significantly higher performance.

"We thought the subdued colors were just right for the health CD-ROM we are promoting," said Kim Garretson, vice president of Mona, Meyer, McGrath & Gavin, a public relations firm in Bloomington, Minn. "You don't want the colors of the internal organs to be too bright, and for our particular application, I'm not sure [the active-matrix display] is worth the price." □

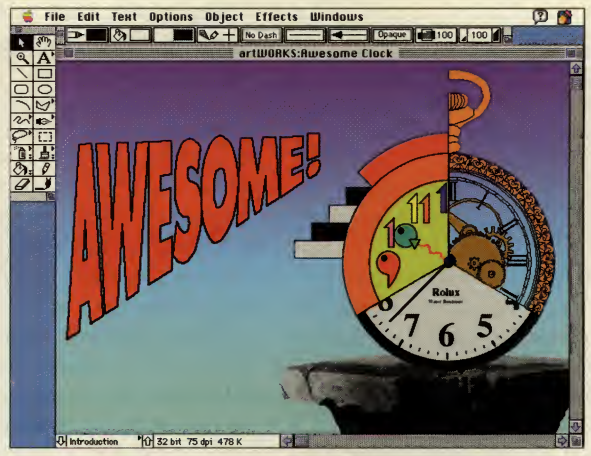
WorldScript bug fix in

San Mateo, Calif. — Connectix Corp. has fixed a bug in WorldScript II, the Apple extension that adds support for languages such as Chinese, Korean and Japanese under System 7.1.

Connectix's Alternate Input Tuner, released last month with the company's CPU 2.0 utility and available free on on-line services, fixes a problem that prevented some programs from being able to detect double-byte foreign-language characters entered using alternate input methods. The bug could also prevent systems from recognizing some configurable hot keys.

Connectix said Apple is likely to fix the bug in a future release of WorldScript II.

Connectix Corp. is at 2655 Campus Drive, San Mateo, Calif. 94403. Phone (415) 571-5100 or (800) 950-5880; fax (415) 571-5195. □



Users can trade in competing programs for artWorks, Deneba Software's painting and drawing program, for $69.

Deneba offers artWorks swap

By Kirsten L. Parkinson

Miami — Aiming to rake in users of competing products, Deneba Software last month announced a $69 trade-in to its artWorks painting and drawing application.

Users of any other painting or drawing program, including Aldus SuperPaint, Aldus IntelliDraw and Expert Draw from Expert Software Inc., can get artWorks for the special price, Deneba said.

The company recently shipped Version 1.0.1 of the $149 artWorks, which offers image-editing capabilities as well as painting and drawing tools (see MacWEEK, Nov. 23, 1992). The upgrade adds support for a wider range of TIFF files, including those created in Adobe Photoshop.

artWorks' Smart Memory feature, in which the program automatically adjusts its memory size as needed, has also been improved, and the upgrade corrects compatibility problems with some Mac Plus models.

Upgrades are free to users who report compatibility problems to the company's technical-support department.

Deneba Software is at 7400 S.W. 87th Ave., Miami, Fla. 33173. Phone (305) 596-5644; fax (305) 273-9069. □

Apple to unveil DAL ODBC tool kits

San Francisco — Apple and Microsoft Corp. will take the stage together at this week's DB/Expo '93 here to discuss plans for integrating their data-access technologies.

Apple is expected to announce additional of support for the Open Database Connectivity (ODBC) specification, Microsoft's standard for linking desktop applications with SQL databases, in its Data Access Language (DAL). Apple first promised ODBC support last July.

Apple, sources said, will announce a tool kit that will help developers create ODBC drivers and ODBC-aware applications. Layering ODBC on top of DAL would make it easier for developers to port database-savvy applications between Macs and Intel-based systems.

Representatives from IBM Corp. and Blyth Software Inc., which markets DAL development tools and client software for DOS and Windows, will also take part in the announcement.

Apple declined to comment. □

Printers

From Page 1

80960 RISC processor and 4 Mbytes of RAM. It offers automatic switching between Level 2 and enhanced PCL 5 and between its LocalTalk and bidirectional parallel interfaces. Users will not be able to expand the printer with additional interfaces or memory, and there is no port for a hard disk, HP said.

The device will ship with 35 Type 1 and 10 TrueType fonts. It combines HP's Resolution Enhancement technology (REt), which smooths rough edges on printed text and graphics, with microfine toner, which creates smaller, cleaner dots than other toners, according to the company.

The LaserJet 4ML will come with a 100-sheet adjustable paper tray and offers a straight-through paper path for printing labels and envelopes.

HP this week also announced and began shipping the HP LaserJet 4L, an $849 PCL 5-only version of the printer that includes a 16-MHz Motorola 68000 processor; a parallel port; and 1 Mbyte of RAM, which can be expanded to 2 Mbytes.

▸ **Apple's Personal LaserWriter 300** will connect to the Mac via its serial port. Sources said the printer will probably be priced competitively with HP's non-PostScript configuration of the new engine.

The new printer will use the same QuickDraw driver as the LaserWriter Select 300, which Apple began shipping in February. That printer, priced at $819, also relies on a serial connection, but it is based on a 5-ppm, 300-dpi Fuji Xerox engine (see MacWEEK, Feb. 15).

A second Apple printer using the new Canon engine is currently scheduled for delivery in the first quarter of 1994. Sources said it may use a PDL based on QuickDraw GX, the forthcoming upgrade to the Mac's screen-imaging model (see MacWEEK, March 8).

That printer is also likely to include GeoPort, a new Apple-designed port that can act as a standard or high-speed serial interface. GeoPort reportedly will put in its first appearance as part of the forthcoming Mac Cyclone. Via GeoPort, the QuickDraw PDL may be able to print QuickDraw GX files six to eight times faster than standard PostScript output, sources said.

Hewlett-Packard Co.'s Direct Marketing Organization is at P.O. Box 58059, MS511L-SJ, Santa Clara, Calif. 95051. Phone (408) 323-2551 or (800) 752-0900; fax (800) 333-1917. □

Future Duos

From Page 1

play will measure 640 by 480 pixels, larger than the 640-by-400-pixel screens on current Duos, and will raise the Duo weight from 4.2 to 4.8 pounds.

A 160-Mbyte internal hard disk option will be offered; this Duo will still come with only 4 Mbytes of RAM on the logic board.

One penalty for color will be decreased battery life. The color Duo will reportedly run for about 30 percent less time on a battery charge than the Duo 230.

To make room for the new screen, the top half of the Duo will have to be thicker. As a result, it will not fit into the existing Duo Dock. Apple will offer a new dock lid to accommodate the fatter Duos, sources said.

Other docks, such as Apple's MiniDock, attach to Duos from behind and would require no modification.

▶ **Faster Docks.** Rounding out the October releases will be a new Duo Dock for those who need considerable desktop computing power. The new dock will come with 1 Mbyte of video RAM and support eight-bit color on up to 21-inch displays, sources said. The current Duo Dock does the same on monitors up to only 16 inches.

Ethernet will be built in, leaving the Dock's NuBus slots for other tasks. A 32-Kbyte CPU cache will boost performance of a docked CPU. An FPU (floating-point unit), previously an option, will come standard, sources said.

The new Dock will come prefit to accommodate the thicker Duos. Sources report Apple will offer an upgrade from the current Duo Dock to the new model and point to the current model's punch-out access as evidence this could easily be accomplished with a logic-board swap and new lid.

▶ **Screaming speed.** Apple's pièce de résistance will come during summer 1994 when the company debuts its first Duo with a 68040 processor and 16-bit active-matrix color screen.

The Duo will use a new low-power version of the Motorola '040 processor that requires only 3.3 volts, compared with the 5 volts used by current '040s. The new chip will also give off far less heat, eliminating the need for the large heat sinks used on desktop '040s.

The chip will be fully static; that is, it will not require constant refreshing as current '040s do. It will also be the first '040 to support sleep right on the silicon.

Tentatively named the 68LP040, the new chip is based on the 68LC040, and like the low-cost version of the processor, it does not include an integrated FPU. Samples of the chip are expected this summer with volume shipments expected to begin at the end of this year.

The new Duo will also offer new functionality. While users are currently forced to awaken and shut down a sleeping Duo before docking it, the new model will not have this restraint, sources said. Other than the convenience this offers, it also means users will be able to keep RAM disks intact indefinitely even while docking and undocking the unit.

▶ **The RISC PowerBook.** In the fall of 1994, Apple will reportedly roll out its first PowerPC-based Duo. The power-efficient 603 chip will reportedly also come at a reduced cost, which could make the most powerful Duo one of the cheapest.

When this Duo will ship depends on when Motorola Inc., the company manufacturing the chip, can get samples to Apple for testing. Current estimates say this won't be before January 1994. □

ScriptX

From Page 1

devices, and it will reportedly be the interface between IBM's AIX-based video server and client IBM PCs and compatibles.

The delay in releasing ScriptX for the Mac will force Apple to postpone delivery of a multimedia player it has been developing jointly with Kaleida and Toshiba Corp. The device, codenamed Popeye, was originally scheduled to ship this fall. The delay could push to the forefront Apple's HyperCard-based CD-ROM player, which does not use ScriptX.

Kaleida plans to demonstrate ScriptX at the Seybold Digital World Conference next month. Shortly afterward, the company is expected to deliver a beta version to developers, who will be able to begin production of their applications. About 100 developer kits, based on an alpha release, have already been shipped, Goldhaber said.

Todd Wade, co-director of sales and marketing at The Voyager Company in Santa Monica, Calif., said his company is waiting for ScriptX to bring its multimedia titles and Expanded Books technology to Windows. "ScriptX will quickly solve our problems in going cross-platform. It takes us three months at best to bring a title to Windows after we finish the Mac version. With ScriptX, the same file will work on both the Mac and Windows."

In addition, Macromedia Inc. and Passport Designs Inc. said they plan to release new versions of their authoring programs that will export ScriptX files.

Although developers are eagerly anticipating the release of ScriptX, some are not overly concerned by the six-month holdup. "For all practical purposes it wouldn't matter if it came out tomorrow," said Peter Black, president of Xiphias, a Los Angeles CD-ROM publisher. "When I need [ScriptX] is in time to have products done for the Christmas 1994 season. It's already too late for the '93 holiday season."

Goldhaber said he expects that by Christmas 1994 4 million to 8 million Macs and PC compatibles will have multimedia software that supports ScriptX. □

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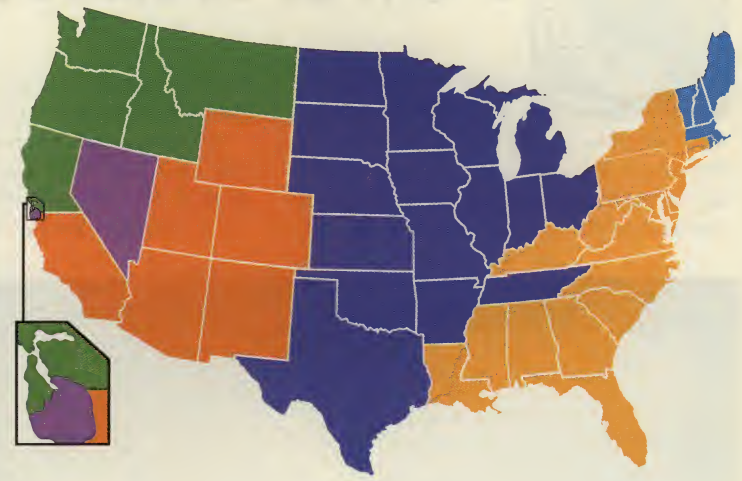
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Looking ahead



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Power is more than a prefix

If the lust for power were a sin or a crime, there would be no shortage of candidates for absolution. But since most of us spend our days in the temporal world, we need be concerned only with criminal manifestations of this most popular passion, and unless carried to extremes, it is not yet a crime.

Is it mere coincidence that every product Apple even considers developing lately includes the "P" word? We have the PowerBook, PowerPC and PowerOpen, and, if previously reported rumors are based in fact, we may one day have PowerPad Newtons. This is not to suggest, however, that the popularity of power is expressed solely in product names. At Apple, as with other large organizations, the struggle to extend power, both personal and organizational, is an ongoing affair.

Consider the series of supercompact PowerBooks that have been reported to the Knife. These smallest of all PowerBooks share dimensions that are suspiciously similar to those of the first round of Newtons, and the similarity doesn't end there. With the proper application, say a PIM or an integrated product, burned into ROM and enough nonvolatile RAM to obviate the need for magnetic storage, these Macs could be formidable competition to the Newtons. The small matter of direct file compatibility with current Macs would also be an advantage.

If extending the market and range of the Mac were as simple as miniaturization of an existing product, the Newton itself might have been merely a stillborn twinkle in some marketing type's eye. But here in the real world, the Knife's betting that the downsized Mac project doesn't have a prayer because the Newton team is not inclined to give up its turf for any reason and is so well-entrenched that no one will even ask.

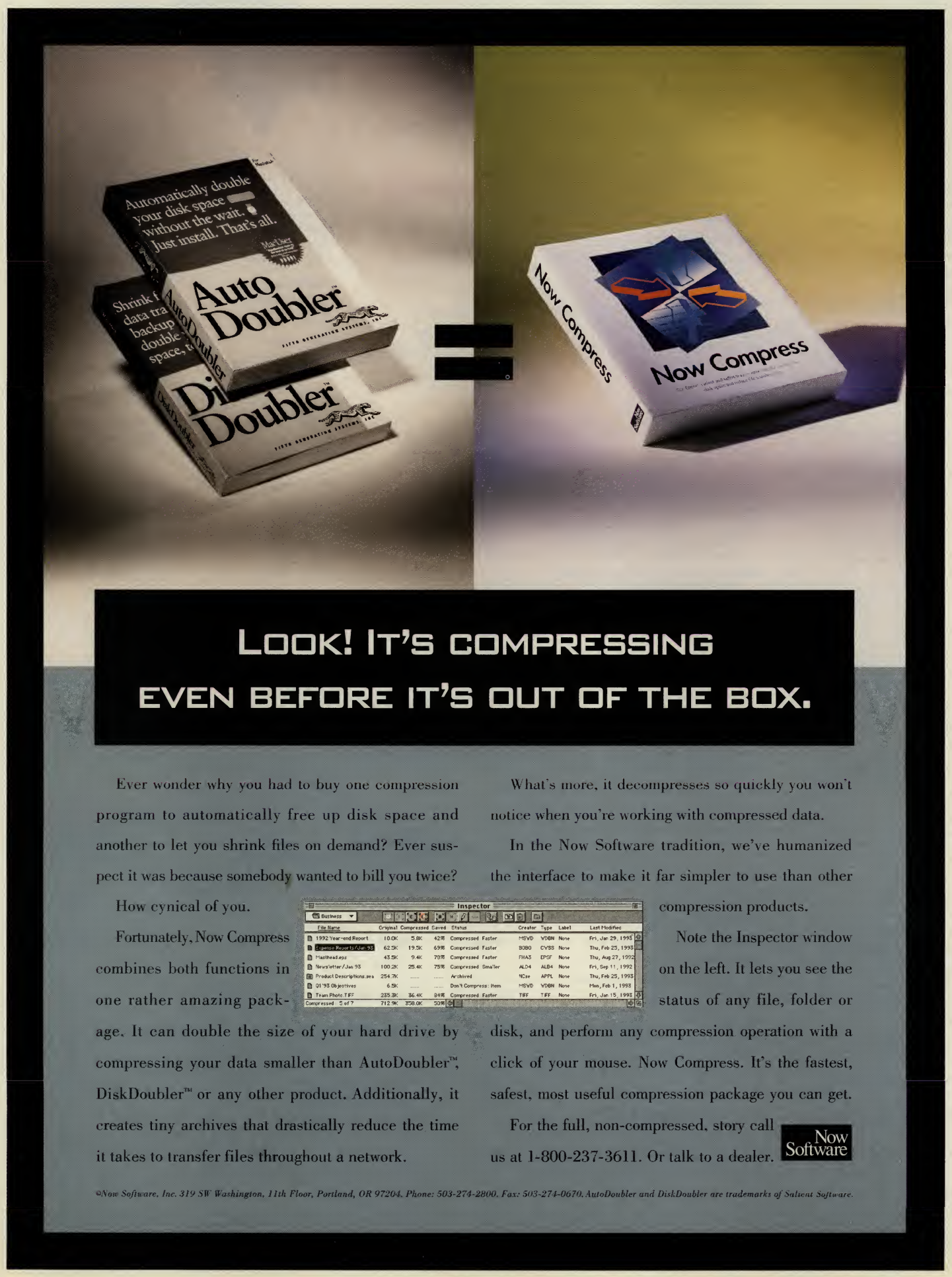
Newton rightsize. Even if the Newtons pan out as the most popular product Apple has ever produced, the bottom line will be that the bottom line is still a matter of great concern. The reason for this seemingly paradoxical situation is that Newtons will provide Apple with the thinnest margin of any product in the company's history. This means that yet another round of "overhead maintenance" is in the works, a fact that certainly won't come as any surprise to the survivors of Apple cutbacks past. This time, however, the executive suite may not be as immune from the slaughter.

There's little indication that things are in any danger of getting as bad as at IBM, where last week you could almost hear the cries of those being permanently cut from the payroll. According to the Knife's sources, workers at some IBM West Coast offices were given as little as two hours to clear out their desks. Maybe an employment stimulation program isn't such a radical idea after all.

Have it your way. If you've been waiting for Tesla, the code name for the alternative to the current crop of PIMs, take heart. The wait may be over in just a couple of months — at least that's the fervent hope of its developer, California-based Common Knowledge Inc. Sources who have seen the prototype report that it frees you from the rigid constraints of existing products and lets you view and manipulate your personal information in truly innovative ways. For those who are troubled by change, the product will also include templates to let you view and manipulate your data in more traditional ways.

And finally, those of you who were bitterly disappointed that the 601 PowerPC prototypes made their debut at the announced 50- and 60-MHz clock rates can hold your tears. The Knife reports that the faster versions are still on the horizon and will be available long before the truly fast 603, 604 and 620 models are available. □

Now that it's been demonstrated that all the real Waco jokes are in Congress, we can get back to this MacWEEK mug business, which starts at (415) 243-3544, fax (415) 243-3650, MCI (MactheKnife), Internet (mac_the_knife@macweek.ziff.com), AppleLink (MacWEEK) or CompuServe/ZiffNet/Mac.





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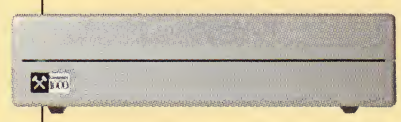
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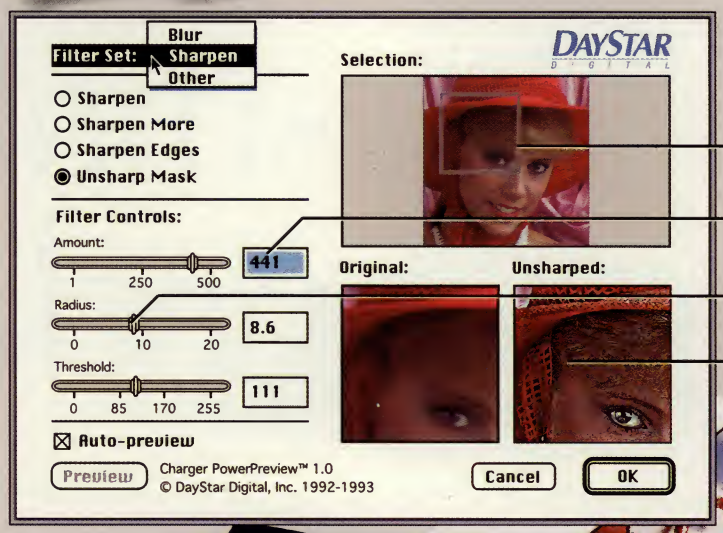
Free Software. In addition to Charger Plug-Ins and PowerPreview†, you get award winning PicturePress 2.5 from Storm Technology... it runs up to five times faster with Charger! We also include Kodak's new Photo CD™ Access software with a complete library of sample images... ready to go!

Power For The Future. Beginning this spring, DayStar will offer even more Photoshop functions, and new "expansion modules" based on patented imaging technology from KEPS. All are upgradable from today's Charger!



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Accelerated filters and functions for Adobe Photoshop™ 2.0.1 and 2.5, Adobe Premiere™ 2.0, Fractal Painter™ 2.0 and Fractal Sketcher™ 1.0.
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Expansion module connectors



Charger PowerPreview™
Eliminate the guesswork within Adobe Photoshop.

Adjustable preview area

Precision input

Interactive slide controls

See real-time effects



DayStar, The Accelerator Company. We pioneered Macintosh acceleration and created an unmatched standard of 100% compatible performance. Also, don't forget our 3 year warranty, unlimited toll-free tech support, and a 30 day money back guarantee**.

Charger Pro Module™
Get even more speed and high-end "adaptive filters" from the KEPS Prophecy™ workstation. (due Spring '93)

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